July 1936

RAILWAY TRACK and STRUCTURES

One of Five Specialized Railway Age Publications

Issue . . .

Trailers
Good Camps

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Bridge Goes
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RMERLY
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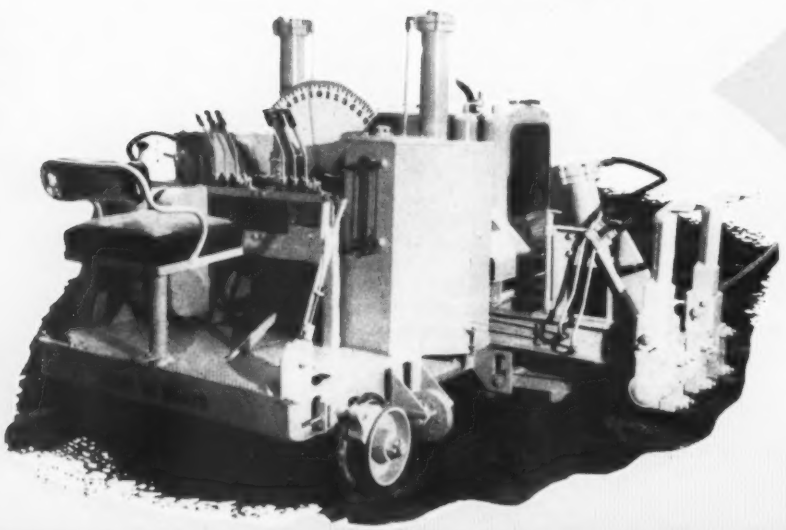
Maintenance

WHAT IS Leadership?



Webster defines it, among other things, as the act of preceding in an opinion or an undertaking.

Or, you could say leadership is the trail of pioneering in fields which haven't been explored before.

That's exactly what has been going on at Kershaw Manufacturing Company for the past 10 years. Research engineers have been burning the midnight oil and developing trackwork machines which have revolutionized track maintenance procedures.

Three of these machines which have put the old-fashioned pick and shovel almost out of business are the Kershaw Ballast Regulator, Scarifier and Plow, the Kershaw Track Broom, and the Kershaw Jack-All, all shown at left. Many more are on the way.

Now Kershaw Manufacturing Company introduces two additional machines which we believe, will be just as important in leading the way to easier, better, more economical track maintenance. They're the Kershaw Crib-Adze and the Kershaw Rail Re-Layer.

For details on these two manifestations of Kershaw leadership, see pages 4 and 5.

MONTGOMERY

KERSHAW
MANUFACTURING CO. INC

ALABAMA

Now . . .

more than ever . . .

Recognize This Symbol

of Leadership!

They don't push this brace around

It's small, this Model 811 Rail Brace. But it has a stubborn streak that more than offsets the crushing pressures it must resist. No jarring wheels, no straining switches are ever going to push this brace around!

A brief look at the 811's design reveals the reason why. Notice that the bracing part itself is welded to the base plate on which the rail rests. Between the web of the rail and the leading edge of the brace a wedge-shaped forging is driven tightly into place. A steel spring in the wedge provides friction which alone could hold the wedge in place.

Just to make things foolproof two pawls on the brace are turned down into slots in the wedge, effectively locking the wedge in position. Thus the 811 Rail Brace becomes all but integral with the running rail, and the rail just has to stay put. No thrust, no sharp impact can shake things up to cause unwanted play.

All over the country this resolute little brace is keeping rails in place—in crossovers, high-speed turnouts, high-degree curved track. There may very well be certain spots on your system which the 811 can brace up. A Bethlehem engineer will be glad to explain the 811 Rail Brace and the way it operates in full detail. You can get in touch with him by a letter or phone call to the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Published monthly by Simmons-Boardman Publishing Corporation, Emmett Street, Bristol, Connecticut, with editorial and executive offices at 79 West Monroe Street, Chicago 3, Illinois; 30 Church Street, New York 7, New York. Subscription prices: to railroad employees only in the United States and Possessions, and Canada, one year $2.00. Second class mail privileges authorized at Bristol, Conn. Volume 52, No. 7.

FOR
RIGHT-OF-WAY
MAINTENANCE

HUBER-WARCO 5D-190 MOTOR GRADER
HELPS KEEP TRAFFIC RUNNING ON TIME

Among modern railroad systems, the use of rubber-mounted equipment for track and right-of-way maintenance is rapidly replacing track-mounted equipment. There is no longer a need to hold up trains or lose important work-crew man hours, while this equipment is moved to a sometimes distant siding.

The Huber-Warco 5D-190 motor grader fits right into this new approach to modern railroading. One man and one grader can perform a variety of jobs without tying up mainline traffic. With plenty of power (195 h.p.) and weight (31,450 lbs.), blended perfectly together for top efficiency, it is possible to move more material with fewer passes.

An Allison torque converter protects the unit from shock loads while a full power-shift transmission—WITHOUT CLUTCH— permits quick shifts under full load, without interrupting the power flow from the engine to the load. A tail shaft governor automatically adjusts engine RPM to meet any load condition, at any speed set by the operator.

Exclusive with Huber-Warco motor graders is the completely hydraulic cab-controlled blade movement which permits the blade to be moved from 90° on one side to 90° on the other without leaving the cab. There are no manual adjustments.

A power sliding moldboard is standard equipment on the 5D-190—there's no deviation from the line of travel. Other important features include: full 360° blade rotation without removing scarifier teeth; four wheel brakes are standard; high front and rear axle clearance; wheels and tires are interchangeable; and all controls are within easy reach of the operator.

Other Huber-Warco torque converter grader models include the 6-D and 7-D series. Models with standard transmission include the 4D-75, 4D-85, and 4D-115. For a demonstration—see your nearest Huber-Warco distributor.

For a demonstration — see your nearest Huber-Warco distributor

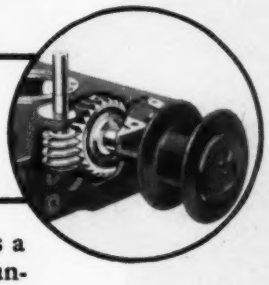
HUBER
W
WARCO

HUBER-WARCO COMPANY
MARION, OHIO, U. S. A.
Road Machinery
CABLE ADDRESS: HUBARCO

ROAD ROLLERS • MOTOR GRADERS • MAINTAINERS • GRINDERS

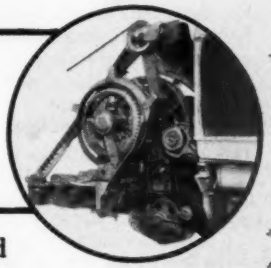
What is the Crane Combination *YOU* need?

NORTHWEST Crane Equipment is so designed as to meet any crane problem you may have. There is a wide range of boom hoist equipment. Mast-type gantry with the sectional boom hoist rigging and pendent lines make possible ease of adjustment to boom length changes. You have a choice of two or three sheaves at the boom point. Adjustable jib, telescopic boom struts, removable counterweight, extended boom point sheave shaft for pile-driver leads—all can be had to meet your requirements. And, if you need long crawlers and wide treads, they're available.



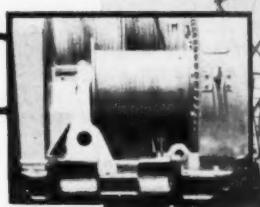
STANDARD BOOM HOIST

The Northwest Standard Boom Hoist is a self-locking worm gear boom hoist running in an oil bath and it operates under power both up and down. It is safe, smooth, positive!



INDEPENDENT HIGH-SPEED BOOM HOIST

The Northwest Independent High-Speed Boom Hoist is independent of all other operations and permits booming with power controlled lowering without sacrificing either of the main drums. It is a rugged, heavy-duty unit capable of hour in and hour out operation. There is no finer, more reliable hoisting assembly.



THIRD DRUM

The Northwest 3rd Drum operates independently of the main drums and is fitted with its own clutch and brake. It makes possible 3 load lines with a standard worm boom hoist; and 3 load lines with the independent high-speed boom hoist.

NORTHWEST ENGINEERING COMPANY
1513 Field Building, 135 South LaSalle Street, Chicago 3, Illinois

NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
CRAWLER OR RUBBER MOUNTED SHOVELS
CRANES • DRAGLINES • PULLSHOVELS

G-400

Announcing The Kershaw CRIB ADZE

Cribs Between Ties and Adzes Tie Heads In One Operation

Kershaw Manufacturing Company proudly introduces the Kershaw Crib-Adze, operated by only one man and capable of doubling adzing production in your rail re-laying gang!

This one machine cribs between ties and adzes ties in a single operation, thereby replacing three obsolete machines in your rail re-laying gang and reducing the cost by approximately 47%.

A cribbing brush cribs between the ties while three adzer heads adze the ties to progressive depths, giving fast, economical operations in your rail re-laying gang.

And here's another important feature! The operator of the Kershaw Crib-Adze is protected from flying ballast, flying pieces of tie and adzer bits because of his position on the machine. There's no need for heavy, bulky protective material. And there's little chance of serious injury.

It's the answer to your rail re-laying problems. We will be happy to arrange a demonstration on your railroad so you can see for yourself.

It's another progressive step by Kershaw!

Now . . .

more than ever . . .

Recognize This Symbol of Leadership . . .

KERSHAW MANUFACTURING CO.

MONTGOMERY ALABAMA

Announcing

The Kershaw RAIL RE-LAYER

Sets Rails To Gauge, Removes Equipment From Tracks

Here's another new machine by Kershaw Manufacturing Company to help solve your trackwork problems. It was developed, tested and proven on the job.

It's the Kershaw Rail Re-Layer to be used in your rail re-laying gang.

The self-propelled Kershaw Rail Re-Layer needs only one man for operation and one helper to set in new rail. The hydraulic ram at the front of the machine picks up the rail from beside the track and lays it to gauge after the ties have been adzed.

The boom at the back of the Kershaw Rail Re-Layer is used to set other equipment off the track. And since the Kershaw Rail Re-Layer also is equipped with a crawler tractor, it can then take itself off the track, clearing the way for passing trains in a matter of minutes.

Used with the Kershaw Crib-Adze, the Kershaw Rail Re-Layer gives you the fastest, most economical rail re-laying gang ever developed.

It's another progressive step by Kershaw!

Now . . .

more than ever . . .

Recognize This Symbol of Leadership . . .

KERSHAW
MANUFACTURING CO. INC.
MONTGOMERY ALABAMA

One of the first ALL STEEL STRUCTURES...

Above left, oxygen cut being made in deck of old bridge. Directly above, old bridge is dwarfed by new lift span.

Goes the fast, efficient way of oxygen cutting

Sixty-three years old, and one of the first all steel structures built in the United States, the steam operated swing span, shown at left above, has carried up to 140,000 passengers a day in and out of New York's busy Manhattan Island. After suffering the mechanical ills of old age, this New York Central Railroad bridge was skillfully removed by using LINDE oxygen cutting.

The old bridge had a four track right of way with a girder structure separating tracks 1 and 3 from 2 and 4. After the tracks were taken up, the deck of the bridge was divided by a series of transverse and longitudinal cuts, and removed. Super structure beams were next to be cut off. Finally, the main side girders were cut into portable lengths and lowered away.

Oxygen and acetylene gases were supplied to the cutting torches by centrally located LINDE cylinders manifolded together.

No matter what your fabricating, repairing, or scrapping needs may be—LINDE can help you do the best job, in the least amount of time. Call your local LINDE representative for detailed information on LINDE'S processes—or write for specially prepared literature. Start saving now, do it today.

RAILROAD DEPARTMENT

OXWELD TRADE-MARK

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under this familiar symbol...

"Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.

Don't Be "IN THE DARK" about Track Insulation

• A tunnel-mouth view of the Southern's well-maintained track near Chattanooga, Tenn.

Use RAJO Renewal Fibre

Here's Why

- The best vulcanized fibre obtainable.
- Perfect fit—identical to original parts.
- Rigid inspection.
- Dependable field service by engineer specialists.

YOUR insulated joints need the best in fibre renewals. RAJO Renewal Fibre out-performs and out-lasts others not only because the best obtainable fibre is employed but it is made to the master designs used for the original fibre parts. This precise fit is vital in the efficient and durable performance of the whole joint assembly. It is good practice to see that these renewal parts are equivalent in every respect to the original parts.

THE RAIL JOINT COMPANY, INC.
50 Church St. New York 7, N.Y.

Skeletonize . . . Renew Ties . . . Reballast

FIRST PASS of double-track Cribber Plow skeletonizes, moving old material all to outside. Tie renewals made easy. While track is lifted by plow, ties can be knocked loose, new ties inserted.
SECOND PASS with Ballast Sled gives a lift of 4 to 8 inches. Sled works behind material flat car.

AFTER a pass with the plow to skeletonize and renew ties, sled was used to put a uniform 5-inch layer of new ballast under the ties.

. . . FASTER AND CHEAPER WITH THIS PROVEN MANNIX METHOD!

NOW . . . a job-proven *plow* method of ridding cribs of badly fouled ballast even under wet and muddy conditions, settles track on original bed ready for sled-ballasting and raising. Plows are available to work either single or double track. . . . a job-proven *sled* method of raising track on newly unloaded ballast or utilizing existing crib material for sub-ballast. Pefected by MANNIX, this new plow-sled team is now extensively employed by several leading roads, with overall cost savings of one-third on track maintenance and complete rehabilitation projects.

Write, wire, or phone today for further information. Plows and/or sleds are available on a special rental plan.

MANNIX INTERNATIONAL INC.

1154 Northwestern Bank Building, Minneapolis 2, Minn. Phone: FEderal 9-7709

Look!
No weeds
in this yard!

Weed Control is no chore...when you use new

EFFECTIVE...ECONOMICAL

UREABOR®

WEED and GRASS KILLER

Applications of UREABOR are almost effortless

NOTHING TO MIX — NO WATER TO HAUL

There's no easier way to end weeds for a season or longer! That's why UREABOR has been such an instantaneous success with all types of industry. You, too, will want the effective and lasting destruction of plant-life offered by this newest addition to our line of nonselective herbicides.

UREABOR is a granular urea-borate combination in dust-free form for fast, easy application at low rates. This chemical destroys weeds and grasses through their root systems. Its residual action, preventing regrowth for long periods, helps hold man-hours for "grassing" to a minimum.

UREABOR has desirable features. It's concentrated, nonflammable, and nonpoisonous when used as directed. Easy to apply—just a man with a special PCB Spreader can be effective anywhere.

Write today for literature!

Dry application—like this—destroys weeds and grass...prevents regrowth for a season, or longer!

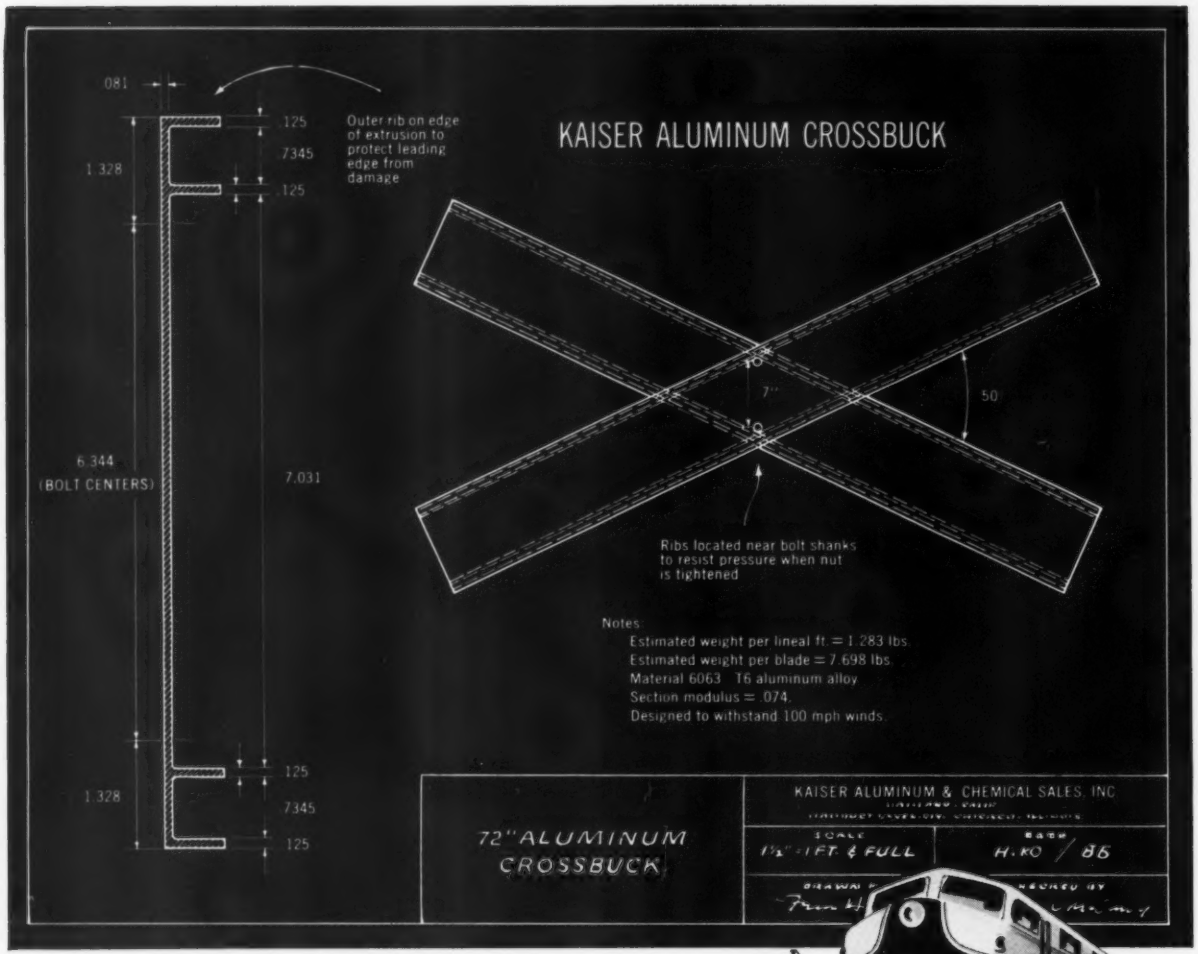
Special Spreader now available for fast, easy application...

The PCB Spreader applies UREABOR to best advantage, at prescribed low rates. It holds enough UREABOR to treat 1250 to 2500 sq. ft. without refilling—weighs a mere 6 lbs. Available now for just $10.75 delivered—anywhere in the U.S.A.

AGRICULTURAL SALES DIVISION

PACIFIC COAST BORAX COMPANY

630 SHATTO PLACE, LOS ANGELES 5, CALIFORNIA



Stronger

because it's the Kaiser Aluminum extruded crossbuck design!

THE SECRET OF STRENGTH of this lightweight crossbuck—adopted as standard by a number of major railroads—is a unique rib design developed by Kaiser Aluminum engineers.

Note in the illustration the strategic location of the outer ribs on *the edge* of the buck. This prevents damage to the leading edges. Also, notice that the ribs are located close to the bolt shanks to resist the crush load when the nut is tightened.

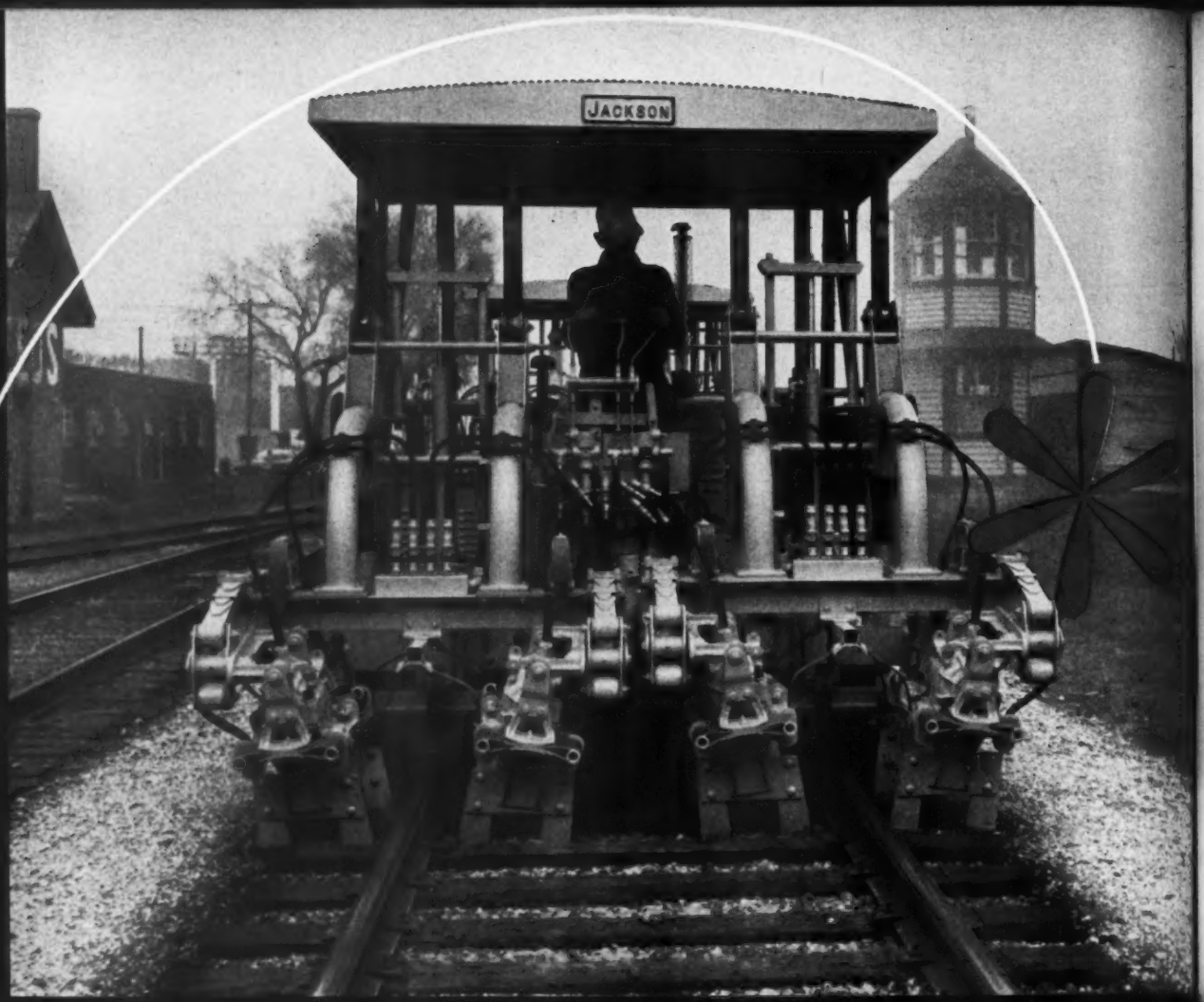
This superior crossbuck is so *corrosion resistant* that it won't rot or rust—even when punctured by rifle bullets. *So strong* that it will withstand winds of 100 miles per hour. Excellent base for paint, reflective buttons, or reflective sheeting such as "Scotchlite" Brand Reflective Sheeting.

Your Kaiser Aluminum sales office will be happy to supply you with full information on the Kaiser Aluminum extruded crossbuck. Ask for our new booklet "The Sign Of Modern Times."

Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office,* Palmolive Bldg., Chicago 11, Illinois; *Executive Office,* Kaiser Bldg., Oakland 12, California.

Kaiser Aluminum

See "THE KAISER ALUMINUM HOUR" Alternate Tuesdays NBC Network. Consult your local TV listing.



JACKSON TRACK MAINTAINER

The evidence of this machine's great superiority as a means of both putting up and maintaining track of finest quality — in any ballast, under ALL conditions — is so preponderant that we confidently predict neither you nor any track chief who possesses the complete facts will specify any other. By all means write, wire or phone for complete information before making any commitments.

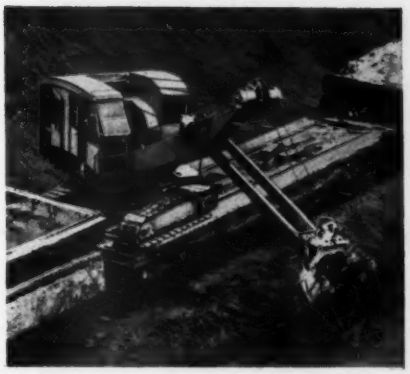
Acquirement plans to suit your needs.

JACKSON VIBRATORS, INC.

LUDINGTON, MICHIGAN

WORK ON OR OFF-TRACK with Koehring self-propelled RailAid®. It travels at 20 m.p.h. rail speed, gets on or off-track in 10 minutes. Lifts 6.9 tons on car, 8.9 tons on ground, converts to clamshell, dragline, piledriver, ½-yd. shovel, hoe.

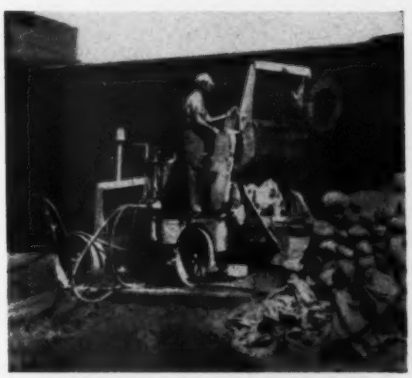
GET MORE WORK CAPACITY on work trains or independent off-track operation. Check all 5 sizes of Koehring heavy-duty excavators, with standard attachments for any construction, maintenance, and material-handling applications.

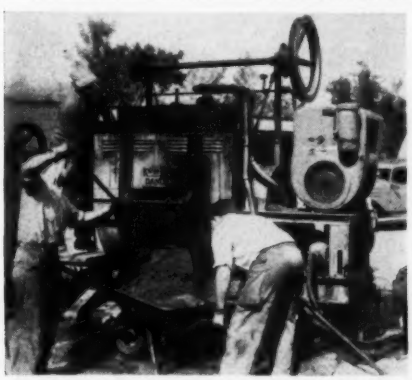


Have you overlooked any of these IDEAS?

LOAD BALLAST, RIP-RAP from track-side pits and quarries into rail cars with Koehring Dumptors®. This 6-yard hauler has one-second gravity-dump (no body-hoist maintenance), 24% gradeability — has same speeds forward and reverse.

STABILIZE TRACK BEDS, correct softened ballast pockets in sub-grade, high fills and trestle ends with Koehring Mud-Jack®. Pumps soil-cement slurry into the weakened area, leaves firm sub-grade. No interruption to rail traffic.





MAINTAIN SMOOTH CROSSINGS, pave platforms, parking areas, walks with Kwik-Mix bituminous mixer. Sizes: 10 and 14 cu. ft. Mobile rubber-tire mounting. Adaptable as stationary central-mix plant, skid-mounted on platform.

MECHANIZE MATERIAL-HANDLING with Kwik-Mix Moto-Bug®. It's three tools in one — has interchangeable ½-ton (6-foot) fork lift, 10 cu. ft. hopper, and ¾-ton platform. Larger size also available with multiple attachments.

SPEED C.T.C. SYSTEMS — On installation of underground cables and conduits, Parsons utility-size Trenchmobile® digs up to 14½ feet of trench per minute. Widths, 8 to 16 inches. Depths to 5 feet. Has 12.6 m.p.h. rubber-tired mobility.

LOAD, UNLOAD CARS, stockpile materials, clean ditches with Johnson all-welded clamshell buckets. Wide-rehandling, general-purpose, and heavy-duty-digging types. In 10 sizes from ⅜ to 3 cubic yards.

.... KOEHRING Company MILWAUKEE 16, WIS. Subsidiaries: PARSONS KWIK-MIX • JOHNSON

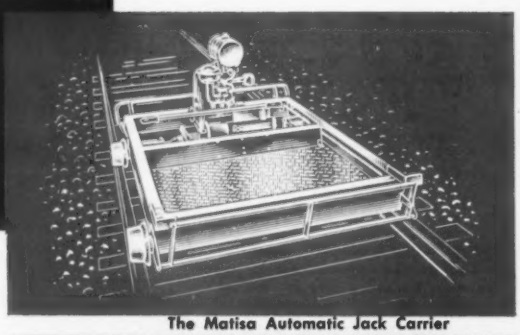
Matisa

ELECTRIC FLASH RAIL WELDER

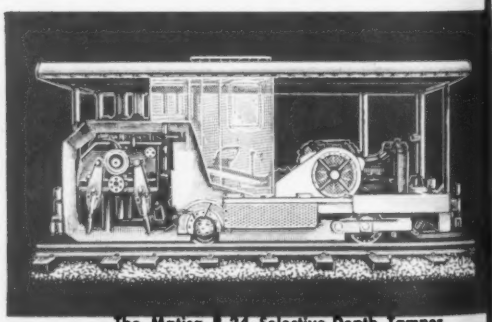
NOW WORKING ON THE GREAT NORTHERN!

- MULTIPLIES the LIFE of RAIL
- WELDS of the HIGHEST QUALITY
- LOWEST PRICE
- MAXIMUM PRODUCTION RATE

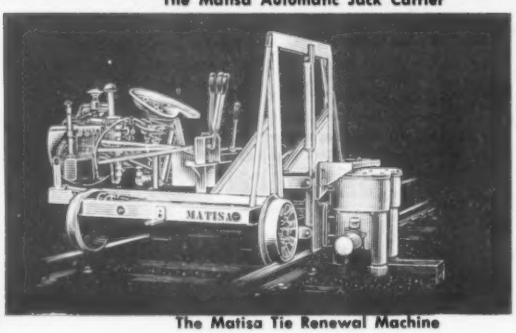
other **MATISA** *TRACK MAINTENANCE MACHINES*



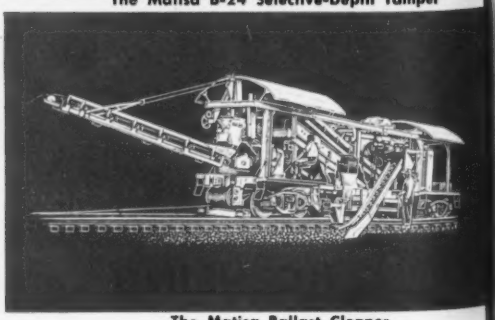
The Matisa Automatic Jack Carrier



The Matisa B-24 Selective-Depth Tamper



The Matisa Tie Renewal Machine



The Matisa Ballast Cleaner

For detailed information on the flash rail welder see page 294 of the 8th edition of the Railway Track & Structures Cyclopedia—or send for literature on this or other machines shown at right.

Matisa

EQUIPMENT CORPORATION

1020 WASHINGTON AVE. • CHICAGO HEIGHTS, ILLINOIS

News Notes

. . . a resumé of current events throughout the railroad world

RAILWAY
TRACK and STRUCTURES
JULY, 1956

Carloadings for the first 22 weeks of 1956 totaled 15,784,153. This was an increase of 956,222 compared with the same period last year, according to a summary compiled by the Car Service Division of the AAR.

•

Pennsylvania's new, lightweight, 574-passenger, "tubular" train began revenue service on June 24 between New York and Washington, D. C. Christened the "Pennsy Keystone," the low-slung coach train combines many conventional features with other concepts only recently accepted in the railroad industry.

•

The union-shop provision of the Railway Labor Act has been upheld by the United States Supreme Court. The court did not strike down state "right-to-work" laws such as the Nebraska statute which was the basis of the case, but held that Congress had made a specific exception of the railroad industry and that the federal law there overrides the state laws.

•

George R. Perrine, chairman of the Illinois Commerce Commission, would like to see railroads that operate commuter service receive tax relief, and, if necessary, a cash subsidy from the state. Mr. Perrine said, "It's cheaper to subsidize railroad commuter service than to build highways."

•

Canadian railroads have signed a contract granting wage increases and "fringe" benefits to 150,000 non-operating employees. The agreement awards a wage increase of 11 per cent to be spread over the next 14 months with part of it retroactive to January 1. Welfare benefits make it a 20-cent increase.

•

Members of the Mechanical Division of the Association of American Railroads have voted to ban loose journal-box packing from all plain-bearing freight cars in interchange service. The effective date for the ban is set for January 1, 1960, and may be extended if necessary.

•

The Southern Pacific will probably spend $118 million on capital improvements during 1956. "Capital expenditures—in some cases, huge ones—have been and are prerequisites of profits . . . " said D. J. Russell, president of the road, at a recent stockholders' meeting.

•

Several railroads throughout the United States are now using closed-circuit television as a tool to improve operations. TV sets in yard offices, interlocking towers and elsewhere, are connected to cameras which act as "seeing eyes" to watch operations in areas beyond the range of vision of the yard clerk, freight-house foreman, ticket seller, leverman, car inspector or ice dock foreman.

•

A 110-mile coal pipeline from Katlain, Ohio, almost to Cleveland, Ohio, will be put in service within the next year. The line, which is expected to cost between $9 and $10 million, will be able to pump 4,000 tons of coal daily. The project is backed by the Pittsburgh Consolidation Coal Company, but three railroads—New York Central, Pennsylvania and Nickel Plate—have options to buy a 45 per cent interest.

Snow-Free Switches

with the RACOR SNOW-BLOWER

The Racor® Snow-Blower is the easiest, safest, fastest, and most economical way to clear snow from the spaces between switch points and stock rails.

Because the Racor Snow-Blower relieves the need for manual attention in bad weather, it saves many hours of labor and many dollars of expense. It's simple to install, easy to maintain, economical to operate.

How the Snow-Blower Works

The Racor Snow-Blower is designed to keep switches clear of snow by intermittent blasts of compressed air. Simple in construction, it consists of a source of compressed air, an air filter, an anti-freeze injector, a cycling device, an air valve and two manifolds equipped with adjustable nozzles.

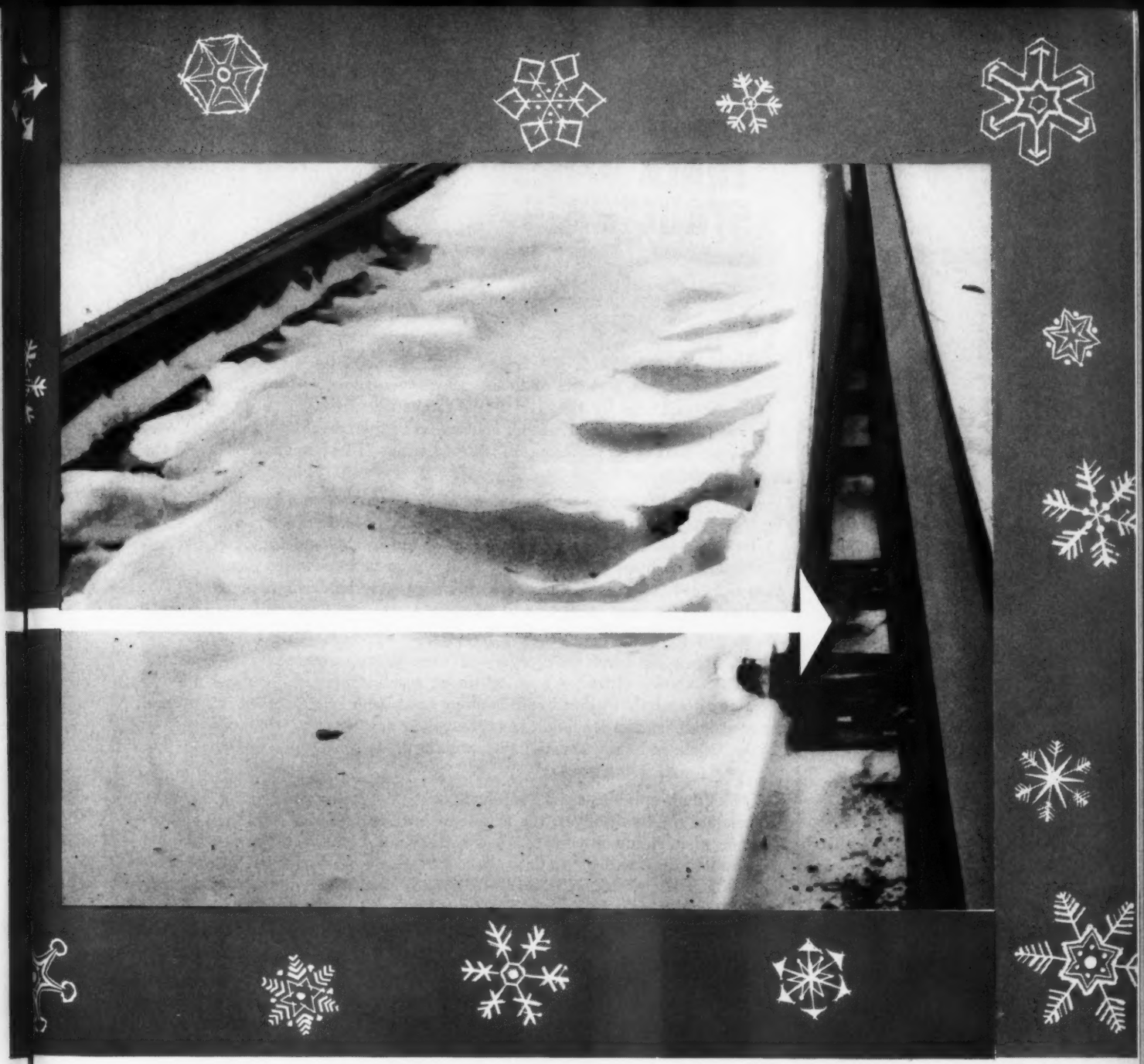
The compressed air can be supplied from a small compressor for a single switch, from a larger compressor with sufficient capacity to serve several switches, or from a central air supply. The manifolds attached to the stock rails cannot interfere with the switch points.

Compressed air passes through the filter, anti-freeze injector, cycling device and then through connecting pipes into the manifolds. The air speed created by the manifold jets, approximately sixty miles an hour, removes snow and dirt from the opening between the switch points and the stock rails.

The blowing cycle can be varied within certain limits, but the usual cycle develops a blowing time of about four seconds in thirty-six seconds. This timing was found to be adequate to keep a switch clear of snow during a total snowfall of 64½ inches in six days, with an air supply of approximately 100 p.s.i.

Compare These Advantages

The Racor Snow-Blower has many advantages, the more important being: Extremely low operating costs—by far the lowest of any other snow removal method. No melted



snow; hence no problem of drainage or icing, or necessity of removal of ice formed from melted snow. No flame to blow out from high winds or passing trains. No danger of fire as a result of leaking oil from tank cars or from diesel engines that might stop over switch. No chance to burn up ties or insulation. If desired, the Racor Snow-Blower can be operated by remote control.

Dirt and sand, which might be carried into the switch with snow, are blown out and not left as a residue, as is often the case when snow is melted through heating methods. The introduction of alcohol in atomized form through the anti-freeze injector, combined with the effect of blowing dry compressed air, has proved very effective during sleet and freezing rain conditions.

Safety is perhaps the most important advantage of all, as employees are not required to manually clear switches under traffic during blinding snowstorms.

The Racor Snow-Blower has been field-tested and proven during five winters under extreme snow conditions. Let your Racor engineer help you put it to use next winter!

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IN CANADA: DOMINION BRAKE SHOE COMPANY, LTD.

RAILWAY
TRACK and STRUCTURES

Subject:

Dear Readers:

Listen to the "Experts"

There are two kinds of "experts" on standards of track maintenance. One kind, of course, consists of those railroad employees who are responsible for the condition of the tracks. We might say these are the professional experts. The other kind is that contingent of the traveling public that does at least part of its traveling on railroad trains. These might be labeled the customer "experts."

It goes without saying that track maintenance officers know their business. Most of them have an intimate knowledge of their territories. Almost foot by foot they know the condition of the tracks, and they can tell you offhand, within a pole length or two, where bad spots are located or are apt to develop. By all the commonly accepted standards of measurement they are the final judges as to whether a piece of track will give a comfortable or uncomfortable ride.

On the other hand, the category of "experts" represented by the traveling public knows virtually nothing about track. Generally persons in this group have only the most rudimentary knowledge of how track is built and maintained. They are quick to express their opinions about the condition of the track, but they can tell you nothing about the types of defects that cause rough riding track.

Yet their opinions cannot safely be ignored because, in a sense, it is *they* who are the final judges; the degree of comfort or discomfort they experience when riding on your railroad will certainly be a factor in determining whether they will continue to patronize the company or will take their business elsewhere. Isn't that the ultimate criterion of whether satisfactory service has been rendered? The adage "the customer is always right" is subject to universal application, and even the trackman cannot ignore it.

It seems pretty clear, therefore, that the opinion of the customer "expert" regarding whether a piece of track is "good" or "bad" should be given considerable weight. He is not, of course, an expert in the accepted sense; terms such as superelevation of curves, corrugated rail, low and battered joints and heaving track are foreign to him. All he knows is that, on the sleeper last night, he was jolted awake on curves or the ride was so noisy he was kept awake most of the night. Or when eating in the diner he was afraid his coffee might slop over, or the waiter might spill soup down his neck. Of course, the trouble might be at least partly due to the equipment or other factors, but laymen almost invariably put the blame on the track. Neverthless, if he has an opinion about the track, his status as a customer makes him an "expert."

Most maintenance officers make it a practice to ride on passenger trains to judge the riding qualities of the track. During these trips, or even when riding to get from one place to another, they may find it enlightening, to say the least, to get reactions on the quality of the ride—and the track—from their colleagues, the customer "experts." It will be interesting to see how closely such opinions parallel your own.

A suggestion is in order here; It's a good idea to find out what the customer thinks about the track before revealing that you are at least partly responsible for its condition.

MHD

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Published monthly by the

SIMMONS-BOARDMAN

PUBLISHING

CORPORATION

79 West Monroe St., Chicago 3

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New York 7,
30 Church Street

Washington 4, D. C.
1081 National Press Bldg.

Cleveland 13,
Terminal Tower

Portland 5, Ore.
835 Terminal Sales Bldg.

San Francisco 4,
244 California Street

Los Angeles 17,
1127 Wilshire Blvd.

Dallas 19,
3908 Lemmon Ave.

Foreign Representatives

Sibley-Field Publishing Company
Ltd.
48 London Wall

London E.C. 2, England
Linder Presse Union GMBH
International Advertising Agency
(16) Frankfurt a.Main
Wittlesbacher Allee 60,
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Subscription price to railroad employees only in the U.S., U.S. possessions and Canada, $2.00 one year, $3 two years, payable in advance and postage free. All other countries, $8 one year, $16 two years. Single copies 50¢. Address correspondence concerning subscriptions to R. C. VanNess, director of circulation, 30 Church Street, New York 7.

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Member of the Associated Business Papers (A.B.P.) and of the Audit Bureau of Circulations (A.B.C.), and is indexed by Engineering Index, Inc.

PRINTED IN U.S.A.

RAILWAY

TRACK *and* STRUCTURES

JULY, 1956 **Vol. 52, No. 7**

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A conversation about rail anchor holding power

Recently, we asked a track maintenance man whether he thought rail anchors should have high holding power. He answered something like this:

"Certainly. How else could they keep rail from slipping? The greater the holding power, the better."

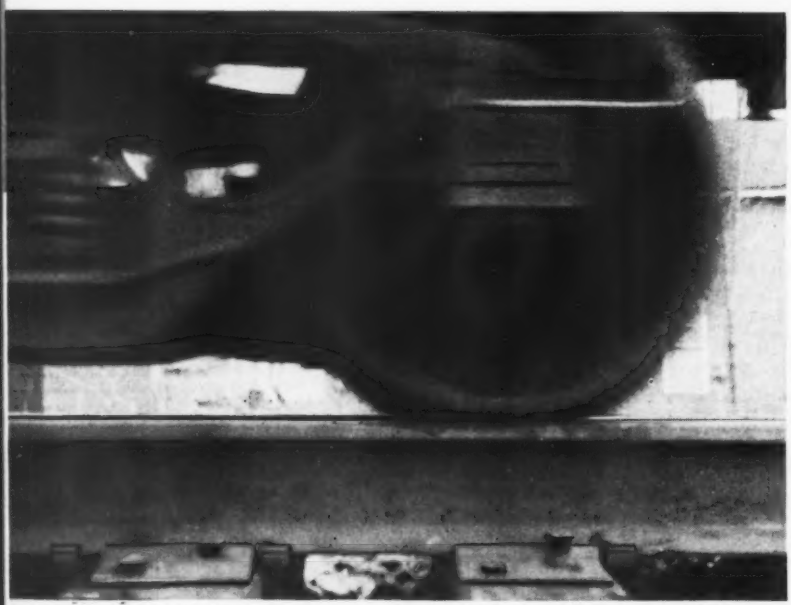
Then we asked about skewed ties and ballast disturbance under anchored rails.

"That's an indication that rail has not been adequately anchored. For normal right-of-way, rail should be anchored at about every other tie. On grades, curves and under heavy traffic, there should be more anchors. Too few anchors place too much load on just a few ties. Result is that the force on each tie exceeds the ballast resistance causing skewing of the ties. If the anchor would be allowed to slip to avoid disturbing the ballast, it would not be performing its function—that of gripping the rail. Where there are skewed ties, then, it is necessary to add more anchors. This divides the load over a greater number of ties, avoids ballast disturbance, and holds rail properly in position.

"Where ballast collects moisture and freezes solid in winter, the ballast has no resilience. This puts extra stress on both the anchor and tie. Unless there is adequate tie-bearing surface, the anchor will cut excessively into the tie, causing accelerated damage."

We agree with this maintenance man. Adequate anchorage, high holding power and large tie-bearing anchor surface are essential to satisfactory, long-lasting and low-cost rail anchorage. True Temper Corporation, Railway Appliances Division, 1623 Euclid Ave., Cleveland 15, Ohio.

New BULLDOG, with its 25% greater holding power, provide surest possible anticreep protection, especially in frozen ballast



When track is adequately anchored, stress is distributed over more ties. Ballast disturbance and tie skewing can thus be avoided.

True Temper's BULLDOG RAIL ANCHOR has a broad, deep and flat tie-bearing surface which reduces tie wear to a minimum

OTHER TRUE TEMPER RAILWAY PRODUCTS: BULLDOG Ballast Forks, Weed Cutters • BULLDOG Shovels • BULLDOG Safety Rail Forks, Hammers, Sledges • BULLDOG Scythes

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25% greater holding power . . . one unit . . . applied by one man . . . using any striking tool

Experience Gives the Answer . . .

Why Trailers Make Good Camps

Finding several advantages in the mobile housing units purchased a year ago, the DT&I is convinced that it has the best means for providing comfortable quarters for the men in its system maintenance gangs.

● One year's experience may not be sufficient with some new products to determine their worth. But it took less time than that to confirm the thinking of the Detroit, Toledo & Ironton that house trailers provide desirable mobile housing for trackmen while they are away from home. Trailer units are obtainable in standard special-purpose models for dormitory, kitchen, dining and office use, and in various utility combinations, so that the road knows that replacement of the units, when that becomes necessary, is not a problem. They are highly mobile, do not interfere with rail traffic, and towing trucks are readily available on the road. And, most important, they satisfy the occupants, hence, good workmen can be attracted and held so that labor turnover is low.

In 1955, when the DT&I decided to establish mechanized system maintenance gangs, the road was faced with several problems. It had one extra gang which was equipped to lay rail and this gang was housed in camp cars. Two other mechanized gangs were organized, one for making tie renewals and another for surfacing work. These were newly formed gangs which would work over the entire railroad, and the matter of housing these forces came up for consideration.

The best source of labor for the DT&I was located in the smaller towns situated at the southerly end of the line. To attract and hold good men to these gangs, it was believed that housing facilities should be as comfortable as was practicable. It was felt that house trailers presented the best means of achieving this end and also offered other advantages. They are relatively easy to heat and keep clean; can be parked close to the work, thus avoiding excessive travel time; do not require the maintenance of sidings to set them on; and the original cost as well as the maintenance expense are less than that of camp cars.

Camp cars were considered to be less satisfactory, particularly because to move them required either a work train, the expense of which was considerable, or the services of revenue trains, to which the operating department had strong objections because of the resulting train delays. On the other hand, the movement of house trailers was no obstacle because highways are plentiful along the railroad and the trucks which the road planned on assigning to each gang would be available for moving the trailers.

Main Reasons Why DT&I Uses Mobile, Off-Track Housing

- **Helps to attract and hold good men**
- **Can be parked close to site of work, reducing travel time**
- **Easy to heat and keep clean**
- **No delays to revenue trains when moving camps**
- **No siding occupancy necessary**
- **Initial and upkeep expense less than for camp cars**

CAMP is usually made in a town close to the work site, thus reducing travel time, and where water and electrical connections can be conveniently made.

Has 11 Trailers

The road decided to use a 25-man gang for making tie renewals, starting work in April, and a 16-man surfacing gang, starting this work in June. For housing the men in these gangs the DT&I purchased 11 trailer units from the Morrison Railway Supply Corporation, with six units delivered by April and five by June, 1955.

For the tie gang the trailers consist of a kitchen unit, one dining-recreation unit, an office unit for the foreman and assistant foreman, and three eight-man sleeping units. For the surfacing gang the camp trailers are the same as for the tie gang with one less dormitory.

Why Trailers Make Good Camps

KITCHEN CAR has two refrigerators, a four-burner cooking range with oven, a double sink, and a hot-water heater. Storage cabinets form long working space.

The trailer units are the standard special-purpose types as manufactured by the supplier and are self-contained so that they may be used away from town limits when necessary. All have 8-ft wide by 22-ft long bodies mounted on four wheels placed in tandem, two to a side. The bodies have an aluminum exterior and are insulated and vented. All are wired for 110-volt lighting and also with a 6-volt wiring system for the running and clearance lights and for the electric brakes. All are heated with oil-fired space heaters.

The eight-man sleeping unit contains eight bunks and lockers as well as a shower, hot-water heater, chemical toilet and wash basins. The foreman's car contains quarters for the foreman and his assistant, with additional space for an office and for the storage of supplies.

The kitchen car provides living quarters for the cook and camp helper at one end and a fully equipped kitchen at the other, which are separated from each other by a partition. The kitchen has a four-burner cooking range with oven, two electric refrigerators, a double sink, and a hot-water heater, and is lined on each side with cabinets which also form long working counters. The dining-recreation unit contains a long dining table and folding chairs.

When set up as a camp, the foreman's car and the sleeping units are parked a few feet apart and parallel, and the kitchen and dining units are parked five feet apart end to end so that food can be carried directly from the kitchen into the diner. To permit the doors used for this purpose to remain open during meal times the railroad constructed a 5-ft screened-in "breezeway" between them. This is of portable construction so it can be used repeatedly at various camp sites.

Men Get Food at Cost

The railroad provides a cook and a camp helper at each camp at its own expense. The cook buys the food that the men of the gang request, obtaining it from the local stores. Bills for these provisions are sent to the railroad's general office at Dearborn and are paid by the railroad. The cook keeps a record of the number of meals consumed by each man and sends this statement to the general office where the total cost is divided by the number of meals, and each man's share is deducted from his paycheck. Hence, the men get exactly what they want to eat and pay only the actual cost of the food.

The camp helper assists the cook in preparing the meals, keeps the trailers clean and fills the water tanks. Occasionally he washes the exteriors of the trailer units and cleans their windows. The railroad furnishes oil for the space heaters in 50-gal drums and the helper uses a small can for refilling the heater tanks.

To date no difficulty has been experienced in obtaining an adequate water supply. The camp site usually is located where water is available from a DT&I water connection. If this is not practicable, arrangements can usually be made by payment of a reasonable fee to tap on to a water connection of some adjacent property owner. When the camp is set up at some place where water is not available, the railroad has a two-wheel tank trailer, with a capacity of 300 gal, for hauling water.

Also, there has been no problem in obtaining electrical connections in towns. No difficulty is anticipated even if the camp site is out of town as commercial power lines are available along the railroad and a transformer can be used to step down the current if necessary. In the event that commercial power lines are not readily available, the road has provided an electric plant for each outfit.

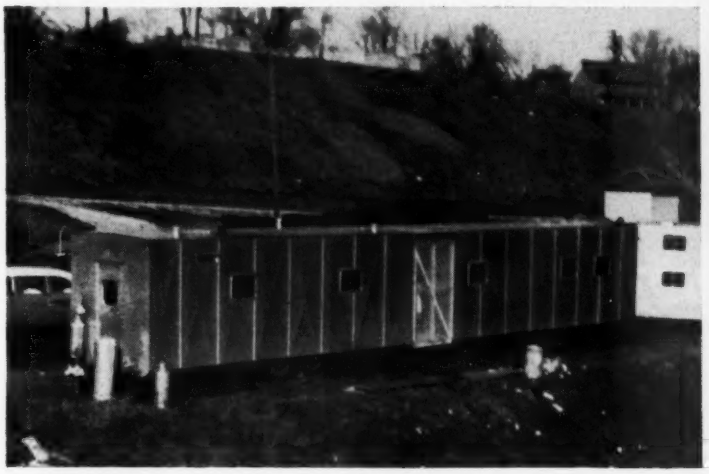
The type of chemical toilet used in the trailers has no overflow so there have been no difficulties arising from a sanitary standpoint in selecting locations for camp sites.

How Camps Are Moved

When a camp is to be moved to a new site no farther than 15 or 20 miles distant, the two trucks assigned to the gang and a truck assigned to the section on which the gang is working are sufficient to move the trailers. The total length of a truck-and-trailer combination is about 45 ft, which complies with the limitations set by both Michigan and Ohio, which are the two states in which the DT&I is located.

When moving the camp, the trucks first take the trackmen to work and then come back to move the office and bunk cars. Meanwhile the cook and his helper are getting the dishes washed and the box lunches prepared. When the three trucks (including one from the local section) return from their first hauling trip, one will take the lunches out to the gang while the other two haul the kitchen and dining cars to the new site, after which the cook will start preparing dinner. If there is still another trailer unit to be moved, the truck which took out the lunches will be used on its re-

"Breezeway" Connects Kitchen and Dining Units



A "BREEZEWAY," of portable screened-in construction, was built for use between the kitchen and diner so food can be carried directly into the . . .

. . . DINING CAR, which seats about 20 men at table; serves as recreation unit in evening.

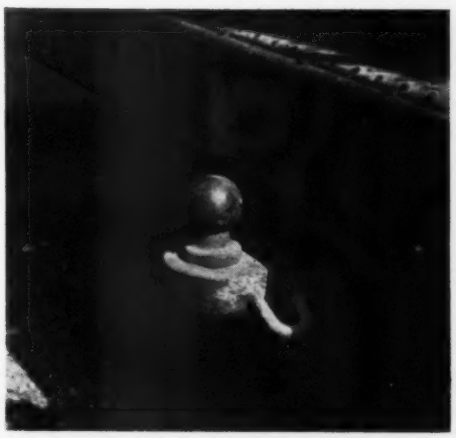
turn to haul this one to the new camp.

Longer moves will require more trucks and these are obtained from the nearest three or four sections, each of which has a van-type truck equipped with trailer hitches and electric-brake connections. The trucks and trailers then move over the highway in one convoy. The lead and rear trucks of the convoy are the two which are assigned to the maintenance gang as these are equipped with radio (RT&S, June, p. 38). By having these two trucks in the lead and rear positions, radio communication can be used to keep the convoy together even though the individual units are spaced 400 to 500 ft apart. This is the preferred spacing to permit other vehicles to pass.

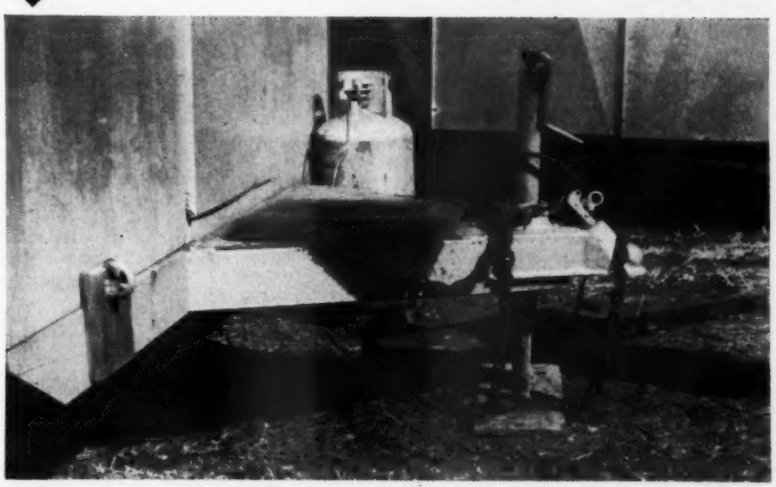
No men are permitted to ride in the trailers while they are being moved. The long camp moves are made on a Saturday, while the men are away, and the gang's work schedule is planned accordingly.

The 11 trailer units are now being used for their second working season and they are in excellent condition. The DT&I is entirely satisfied with the performance of the trailers, and the trackmen also like them. The road believes the units are constructed to withstand heavy usage. When necessary, they will be replaced with new units as the road, on the basis of its present experience, will continue to use trailers for housing its maintenance men.

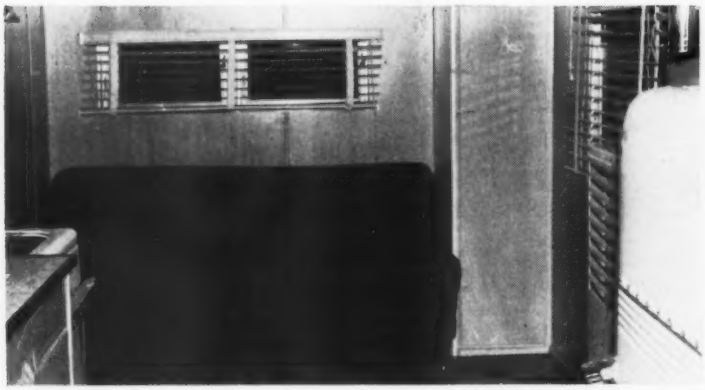
ALL M/W TRUCKS have been equipped with trailer hitches for making a quick connection with . .

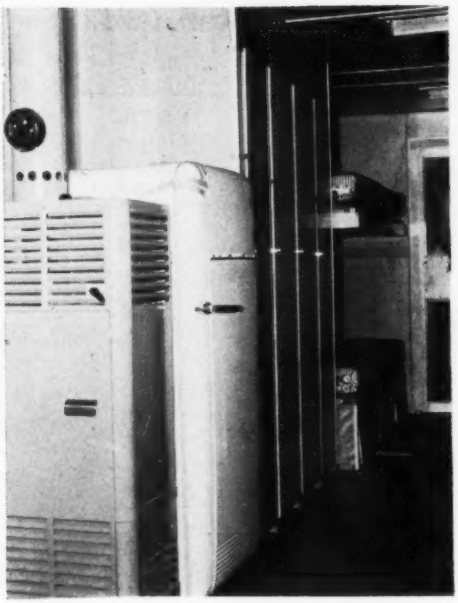


COUPLINGS of trailers, which have electrical connections for brakes and clearance lights.



What Other Roads Are Doing About Trailers





TRAILER built for Rock Island to house five-man paint gang is shown in these views. Sofa in photo above opens into bed for foreman. At other end (right) are bunks for four men. Trailer was built by Camef Equipment Corp.

Report on Mobile Housing . . .

Trend to Trailers Continues

A year ago this month a comprehensive staff report was published in this magazine on the use of mobile, off-track housing for M/W gangs. At that time the use of trailers on most roads was on an experimental basis. Now —a year later—it is pertinent to inquire whether the results have been satisfactory or otherwise. To get the answer, a questionnaire was addressed to a number of roads known to be using trailers. The results are given in this article.

● Railroads using mobile, off-track-housing for M/W employees are, on the whole, satisfied with the service they are getting from this type of equipment. This conclusion is based on replies to a questionnaire sent to 19 railroads known to be using trailers. Fourteen complete replies were received.

The questionnaire was designed to bring out the kinds of trailers being used, the types of personnel being housed in them, whether they have given satisfactory service, and whether the railroads using trailers feel they are justified in acquiring similar additional units.

To the latter question, all of those replying answered "yes," although two roads qualified their answers. One of these felt justified in acquiring additional trailers "for special cases," while the other said it was in favor of acquiring additional trailers "for gangs not over four men."

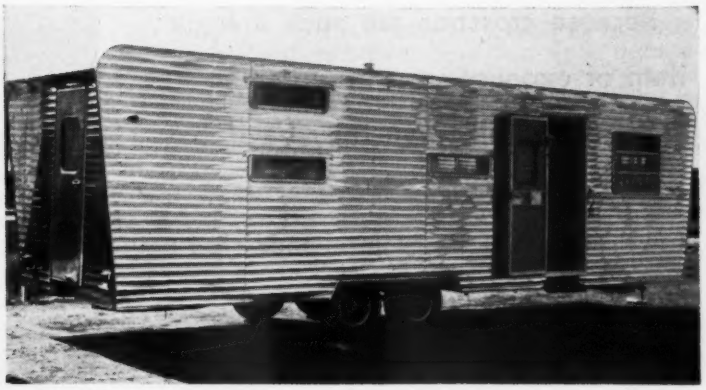
All but one of the railroads replying have trailers of the self-contained type, i.e., trailers in which each unit has complete living facilities. The number of such trailers owned varies from 1 to 102, and the total number owned by the 13 roads comes to 243.

The gangs being housed in the self-contained trailers range from one to five men. They include welding crews, special equipment operators (cranes, track maintenance machines, and grading units), B & B repair gangs, paint gangs, and foremen or supervisors, with or without their families.

Exactly half of the railroads replying have trailers of the special-purpose type, i.e., trailers in which each unit serves a particular purpose, such as sleeping, cooking, dining, etc.

The seven roads owning trailers of this type have a total of 662 units, with the number owned by each road ranging from two to 617.

FIVE SIGNAL CREWS and three communication gangs on the Milwaukee have been equipped with house trailers. Each 10-man crew has three trailers, one for cooking, eating and recreation, one for sleeping six men, and one for foreman and three men. These trailers were furnished by Mon-O-Coach, Inc.



ANOTHER Rock Island trailer for five-man paint gang, this one built by Platt Trailer Company. Both have similar layouts.

BOTH TRAILERS have propane gas stoves, double sinks, cabinets below and above, electric refrigerators, hot-water heaters, door at rear.

The types of gangs being housed in special-purpose trailers include track-maintenance crews, bridge and building gangs, carpenter gangs, paint gangs, and communications and signal repair and construction outfits. The railroad with 617 special-purpose trailers uses them for housing most of its large gangs, such as bridge and building repair gangs, timbering and track-surfacing gangs, construction crews, etc. This is the same railroad, incidentally, that has 102 self-contained trailers.

Answers Summarized

Answers to questions relative to the more important advantages and disadvantages of trailer housing are summarized at the right. It is significant to note that all the railroads replying indicated that, in their opinion, the advantages outweigh the disadvantages, although in two instances the respondents indicated that they were referring only to trailers for small crews.

In answer to a question regarding whether the men who occupy trailers prefer them to campcars, 11 answered in the affirmative and 3 in the negative, thus indicating that in general trailers have advantages for the men as well as for the railroads.

On the basis of the replies received, it may be stated conclusively that trailers have become an accepted form of housing on many railroads, and that it can be expected that these roads, as well as others, will be acquiring additional trailers as time goes by.

Users Find These Advantages . . .

MOBILITY—Can be moved at will to new job site, and in less time, thereby facilitating work planning. No need for using work trains or local freight service.

FLEXIBLE PARKING—Can be located close to work, reducing travel time, and parking site can be chosen with regard to convenience, desirability of surroundings, and safety considerations.

SIDINGS NOT NEEDED—Off-track parking eliminates dependence on spur tracks and releases space for revenue cars.

COMFORTABLE AND CLEAN—Several roads state trailers offer better living conditions and are easier to keep clean.

ECONOMY—Consensus is that trailers offer cost savings partly due to their greater mobility but also because of lower maintenance expense.

. . . and These Disadvantages

SPACE LIMITATIONS—Crowded conditions in trailers were mentioned by several roads; also limited storage space for tools and miscellaneous items.

SANITATION PROBLEMS—Sewage disposal is a problem that is yet to be solved satisfactorily on at least some roads.

LEGAL REQUIREMENTS—Several replies indicated that local and state ordinances governing the parking of trailers and their movement over the highways are proving bothersome.

INITIAL COST—First cost was mentioned by two roads although it was not indicated whether this cost is higher than for campcar equipment.

MISCELLANEOUS—Transportation was mentioned as a problem on a few roads; also lack of capacity for storing fresh water.

However . . .

. . . All roads answering the questionnaire expressed the opinion that the advantages of trailers outweigh the disadvantages.

Because crossties are such a large item of expense, and because the ability to tell when they have lived out their service life is a matter of judgment, it is important that every trackman know the answer to the ever-present question:

When Should A Crosstie Be Renewed?

Part 1

By R. B. Radkey
Engineer Ties & Treatment
Illinois Central
Chicago

● Efficient financial operation necessitates that expenditures be in line with revenues; therefore, crosstie renewals will always be closely coupled with the amount of available maintenance money. The curve of annual crosstie renewals follows the financial status curve more closely than can be justified on a straight engineering basis. Thus we may assume that when money is available ties will be renewed, and when money is not available, ties will not be renewed. It is our job to spend the amount of money, be it large or small, in the best place. A practical and logical crosstie renewal policy, as discussed here, will be advantageous toward this end.

Crosstie expenditures should be held in ratio to train usage of the track being maintained. A sufficient number of new ties must be installed to maintain necessary track standards based on train tonnage, speed and a margin of safety. If renewals fall below this number, the track structure will deteriorate, requiring excessive expenditures to return it to operating standard. By the same token, over-maintenance, or an excessive number of renewals, cannot be justified as this money is usually needed elsewhere in maintenance work or to increase the railroad's net profit.

The number of annual tie renewals should be predicated on the actual condition of ties in track. Most railroads maintain some manner of records regarding average crosstie service life and are able to predict, with considerable accuracy, tie renewals required in future years. However, there are any number of practical reasons which can cause this statistical approach to be at variance with actual track conditions. It is better to watch the condition of ties in track and make renewals accordingly than to rely entirely on mathematically based data. Statistics showing an unusually long crosstie service life may simply be a record of deferred maintenance.

As a structural member the modern solid timber crosstie is unique. Its basic shape and usage remains relatively unchanged after more than a century of service, although improvements in size, wood preservation and track fastenings have been realized. Other substances, including steel, concrete, laminated wood and plastic, have been considered. In all probability satisfactory ties could be made from any of these materials, but not at a cost to compete with the solid timber tie. Tie producers tell us that timber supplies are more than sufficient for the foreseeable future; thus, the solid timber crosstie will be with us for some time.

The structural functions of a crosstie are to hold the rails at correct gage within the limits of allowable lateral motion, to transmit the wheel loading from the bottom of the tie plate to the top of the ballast, and to absorb some of the impact stresses.

Defining a Failed Crosstie

Crossties start to fail soon after track installation. A tie may be unsuitable for further service after 5 years under extreme conditions. The same tie might last 50 years under the most favorable circumstances. A new tie, now 100 per cent effective, gradually loses its load-bearing and spike-holding capabilities over a period of years. Most ties removed from track have some effectiveness left; a tie decayed beyond any semblance of spike-holding power may still be transmitting some load to the ballast. We must decide at what stage of deterioration the tie is no longer suitable for service.

There is no single, fixed standard definition of a failed crosstie. A tie no longer suitable for high-speed main track service may have many years of service life remaining if it were located in a little-used side or yard track. The logical selection of ties to be renewed should be based upon a sliding criterion dependent upon the necessary standard of maintenance and the location of the individual tie in the track.

A high degree of effectiveness is required from each

"The billion crossties which support the 327,000 miles of United States Class I trackage represent an investment of over $5 billion, based on present-day reproduction costs. Crossties are one of the most numerous items in our railroads' physical plant. Over 24 million new crossties were laid in maintenance replacements to keep the tracks within operating standards during 1955.

"Labor and material involved in crosstie renewals comprise a major portion of track maintenance costs; thus we should be keenly interested in all factors concerning this expenditure. Some of us are inclined to loose sight of the individual costs involved because crossties are a numerous and common item in our workday. Remember the expenditure for one new crosstie in place often exceeds the revenue collected from 500 ton-miles of freight haul or the annual dividend on a share of the railroad's common stock. Three crossties in place are roughly equivalent to a trackman's daily wages."

crosstie in high-speed, heavy-tonnage main track where differences in load-bearing capabilities are reflected in rough, hard-to-maintain track. The combined effects of tonnage, vibration, ballast abrasion, dragging-equipment damage and weathering are most severe. The adjoining ties suffer when one main-track tie does not carry its full load.

Lighter-tonnage, slower-speed secondary main track does not require as perfect a tie condition as the high-speed, heavy-tonnage main track. Here a lesser portion of tie deterioration is due to traffic, and weathering becomes a more important factor.

Side or yard tracks will have different standards of tie maintenance according to use. Certain yard leads carry more tonnage than main tracks and must be in operation around the clock. Here the best of tie conditions helps insure uninterrupted operation. Some back tracks may have cars on them but several times a year. Under such conditions weathering is almost the only source of tie deterioration, and only a minimum tie-condition standard should be met.

There is further variance in required tie effectiveness in each of the track categories—high-speed main, secondary main, and yard—dependent upon the specific location and use of the individual tie. Curved track requires better ties than tangent track. Ties at rail joints are required to have greater effectiveness than ties in the rail quarter. Ties supporting insulated joints should be in nearly perfect condition, for lack of support here quickly causes insulation failure and rail batter. Other locations requiring a little extra in crosstie effectiveness would include several rail lengths ahead of switch points, at bridge ends, through road crossings, adjacent to railroad crossings, and through station grounds.

Effect of Economic Conditions

Prevailing economic conditions will always be the major factor in establishing tie-condition standards. When money is available, the tie standard will require a high degree of effectiveness from each crosstie. Conversely many ties of low effectiveness remain in track when funds are limited and the tie standard is at a minimum. At minimum standard conditions we hear talk of limiting renewals to the center tie of three bad ties or to just enough new ties to hold gage. Often it is quite surprising how poor the tie condition may be without prohibiting the operation of trains over the track.

After a standard tie condition has been determined or agreed upon, the next problem is to apply this yardstick to ties in track, thus logically selecting those ties which are to be renewed.

All track force personnel should be able to recognize a tie no longer fit for track service. Most of us can see some defect in almost any crosstie; however, the ability to distinguish between a minor defect and a damaging defect is a little more difficult to achieve. The working areas involved in holding gage, receiving spikes, transmitting loads, and bearing on the ballast are concealed by the tie plate and ballast and are not readily visible. The top portion easily seen is of relatively little importance in its influence on the functioning of the tie. However, a little time spent in examining the tie ends and conditions at the tie-plate fastenings will give indications permitting deductions to be made as to condition and performance. Different species of ties are prone to different defects and this distinction should be kept in mind while doing inspection work.

Types of Crosstie Damage →

About the Author

As engineer ties and treatment of the Illinois Central Mr. Radkey, among many other duties, supervises the work of several assistants whose job it is to inspect ties in the company of track supervisors and foremen for the purpose of marking those to be removed. After the ties have been taken out of track Mr. Radkey and his assistants inspect as many as possible of them and they also go over the tracks where out-of-face renewals have been made.

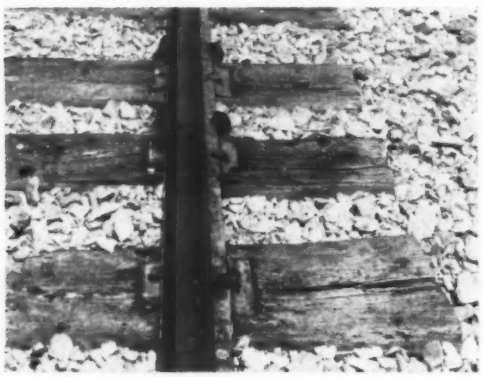
Mr. Radkey acquired much of his knowledge of ties while serving as supervisor of track on the IC. For several years, as assistant engineer ties and treatment, he worked closely with the late C. D. Turley, then engineer ties and treatment, during which period he had the benefit of Mr. Turley's many years of experience in the tie and timber preservation field.

Born on April 24, 1920, at Chicago, Mr. Radkey is a graduate of the University of Michigan (1942) with a B.S. degree in civil engineering. While in school he worked summers with the Chicago & North Western and the New York Central. From June 1942 to March 1946 he was in the armed services. On April 3, 1946, he entered the service of the IC as a junior engineering aid, and progressed through various positions, being made supervisor of track on September 1, 1950. He became assistant engineer ties and treatment on January 1, 1952, and engineer ties and treatment on February 1, 1955.

Examples of Principal Types of Tie Damage . . .

DECAY—This gum tie has advanced heart decay which was probably caused by insufficient seasoning. Several such ties together would be dangerous.

CRUSHED—A 1942 pine tie crushed and shattered because the wood was not strong enough for the load.



SPLIT—This crack will eventually extend clear through the tie in foreground and cause its removal.

PLATE CUT—Small tie plates did not provide sufficient bearing to prevent cutting into these ties. Tie in foreground also has bad split.

Defects that Cause Tie Failure

Defects that will be found causing a decrease in effectiveness sufficient to warrant tie renewal will include the following:

Decay—The destruction of the wood cells and fibers by a fungus-type plant. The result is rotten wood devoid of all its original strength characteristics. Decay will not take place in wood thoroughly protected with creosote or other wood preservative of equal effectiveness. Preservative treatment in crossties usually consists of an outer shell of treated wood surrounding an untreated core, because even the best of modern pressure-treating processes is unable to penetrate the tie completely. The depth of protection may vary from ¼ in. in a white oak tie to several inches in a southern pine tie. Decay may be expected when the untreated interior of a tie is exposed by splits, checks, ring separations, spike holes or damage.

Decay causes tie failure through destroying its load-bearing and transmitting capabilities or decreasing the timber cross section until it cannot hold gage. Untreated ties most commonly fail from decay. Decay is not uncommon in timber species such as white oak or fir which are difficult to penetrate with preservative. The heartwood of sap gum and some of the mixed hardwood species is quite prone to decay.

Crush or Shatter—The separation of the wood fibers through inability to withstand the physical loading stresses within its elastic limit. The wood separates or brooms into splinters without regard to the annual growth rings.

Disintegration of the timber destroys the load-bearing and spike-holding capabilities. Separation of the fibers will open cracks to the outer surface of the wood, admitting air, moisture, and fungus spores to the untreated interior and permitting further deterioration through decay. Crush and shatter may be expected in fast-growing pine and other woods of relatively low strength.

Plate Cut—The mechanical wearing away of the timber under the tie plate caused by abrasion resulting from tie-plate movement in the lateral planes. Presence of sand (an abrasive) or moisture (a softening agent) under the tie plate will accelerate the attrition. There are indications that plate cutting progresses at a faster rate the deeper the cut goes, all other factors being equal.

Failure is caused by the deepness of the cut. Spikes may protrude from the tie bottom and lose their holding power. The cut may become out of level until the canted rail bearing is unsatisfactory, or a decreased cross section at the point of bending stress allows the tie to break under the rail. Again decay may start when the cut penetrates through to the untreated core.

Plate cut occurs in all species of timber; however it causes the most

SPIKE KILL—Frequent regaging causes a tie to lose its spike-holding ability.

TAMP KILL—A tie can be rendered useless in 10 years by excessive tamping.

trouble and occurs quickest in the softer woods such as pine or cypress.

Split—The separation of the timber caused by a crack which extends from one face to another face. This cracking is caused by a variance of moisture content between the different layers of the wood and is accelerated by traffic pressures and vibrations.

Failure is caused when part or all of the tie separates into two or more smaller pieces of wood which are unable to retain the ballast tamp or transmit loads. Decay may occur when the split penetrates to untreated wood. Oak, gum and hickory are susceptible to splitting, which is probably the major cause of failure in these species.

Spike Kill—The wood immediately adjacent to the spike loses its holding power allowing the spike to move laterally, enlarging the hole. It is thought that chemical reaction between the metal spike, wood preservative, and natural wood juices causes this failure to progress a little faster than normally would be expected. Presence of moisture will soften the wood fibers, facilitating the spike kill.

Failure is caused by inability to fix the track fastenings tightly to the tie, thus causing a lack of effectiveness in the ability to hold gage. Spike kill can occur in any species of wood, but this failure is most closely associated with track locations requiring abnormal amounts of spike adjustment, such as where regaging is done on curves or through turnouts. Rail laying at frequent intervals can bring on spike killing.

Tamp Kill—The attrition of the tie caused by the abrasive nature of the ballast or action of tamping tools. The tie bottom is abraded to a round shape of diminished thickness.

Failure may be caused by the rounded shape being unable to hold the ballast tamp. The tie may wear so thin that spikes protrude from the bottom, and may even break under the tie plate.

Tamp kill is more closely associated with a ballast condition than with a species of wood. Unwashed chat ballast containing large amounts of abrasive dust has reduced a sound red oak tie to a useless "rocking chair" or "sled runner" in less than 10 years. A certain amount of abrasive damage is done during tamping, and track personnel should use care in this regard.

Broken—Fracture of the tie usually occurring where bending stress is highest, at the outer edge of the rail bearing, or at the center in the case of center-bound track. Such a break can nullify the gage holding and load-bearing power as the timber is no longer one structural member.

Natural Defects—Inherent weaknesses of certain timbers have little correlation with track use, although vibration and repeated loading may accelerate the weakness into a major defect. Timber defects would include wind-shakes, ring separations, knots, checks, bark inclusions and slant grain.

Failure would be caused by one of these defects developing into a condition whereby the tie could not function. For example, a wind-shake may develop into a crush deficient in support ability. A knot may admit air and moisture to the untreated interior facilitating decay.

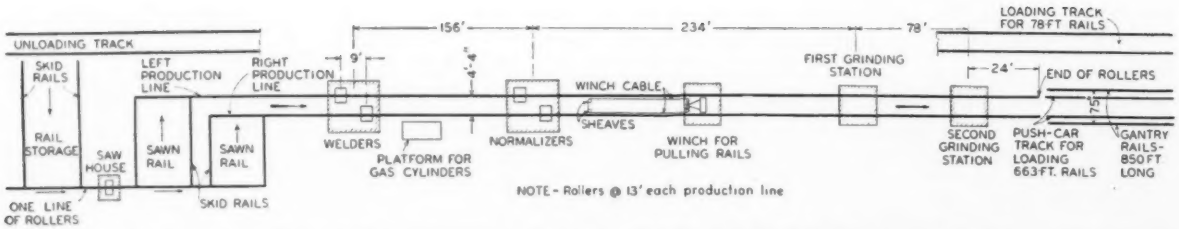
Derailment or Dragging Equipment Damage—Physical damage to ties will be caused by both derailments and dragging equipment. This damage may be severe enough in itself to destroy tie effectiveness, or may accelerate the development of some other defect.

Miscellaneous Causes—Burning started by fuses, grass fires, or brake shoe sparks can completely destroy a tie. Also a certain number of ties removed during track changes will have too short a life remaining to warrant reinstallation.

The aforesaid tie failure causes are simple to talk about, easy to read about, but quite difficult to agree about when viewing a crosstie which has failed and been removed from track. Often it is a question of which came first, the crush or the decay, somewhat similar to the question of the chicken and the egg. We may agree the tie is unserviceable, but may disagree as to the exact technical reason for failure. As trackmen, we are not particularly interested in defining the exact failure cause in terms of timber or wood-preservation technology. However, a certain amount of research work is being done in connection with improvement of timber specifications and treatment.

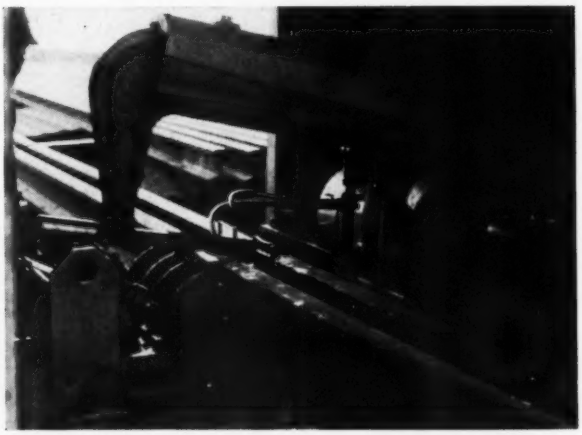
NEXT MONTH: How to Evaluate Tie Defects

When inspecting ties in track what tools are required, and how should failed ties be marked? What parts of the tie should get major attention during the inspection, and what types of defects do you look for at each of these points? How do you appraise the seriousness of a defect; more particularly how do you determine when a defect is sufficiently serious to justify marking the tie for removal? The answers to these and many other questions will be found in the second and final installment of this article, to be published in the August issue.



LAYOUT of welding setup, as shown on this diagrammatic sketch, is such that, if desired, the equipment can be mounted in operating position on a string of cars for portability.

The theory on the Wabash is that, with two parallel production lines, rails can be butt-welded more economically than with two separate installations. This theory has now been put into practice and as a result the road is . . .



RAILS are sawn four at a time in preparation for welding.

. . . Reducing Butt-Welding Costs

● With economy as the primary objective, the Wabash has developed a number of innovations in the welding and handling of butt-welded rails. A basic feature of these efforts has been the use of a butt-welding setup consisting of two parallel production lines. Also of interest is the use of strings of heavy-duty push cars equipped with rollers for hauling the long rails to the site of installation. For loading the long rails on the push cars, the road has developed special miniature gantries which operate on a broad-gage track in such a manner that they straddle the loading track.

In its rail-welding operations, the Wabash is producing ralis in both double lengths and long strings by the Linde Air Products Company pressure-welding method. By means of the special procedures being used, especially the double welding setup, the road reports substantial progress in reducing the cost of making butt-welds. Officers of the road state that welds are now being made at a cost considerably under that of conventional bolted joints, and they add that improvements contemplated in the production line are expected to result in further savings of $1.25 per weld.

The decision to construct the double production-line welding setup was made this year following a number of years' experience with two miles of continuous-welded rail installed at Poag, Ill., near St. Louis, in 1948.

This Year's Butt-Welding Program

A considerable proportion of the new rail to be laid by the Wabash in 1956 will be butt-welded before installation. A total of 15 track-miles of new 132-lb rail will be joined into 78-ft lengths and a total of 7.6 track-miles of new 115-lb rail will be butt-welded in 663-ft lengths. The new rail program this year will include approximately seven additional miles of rail which will be laid in standard lengths. However, if this rail could have been received early enough it would also have been butt-welded into 663-ft lengths.

Of the new 115-lb rail to be butt-welded into 663-ft lengths, 4.8 track miles were scheduled for laying in the main line just east of Moberly, Mo., while 2.8 track-miles were scheduled for insertion at Clifton, Mo., about six miles west of Moberly.

Of the new 132-lb rail to be welded into 78-ft lengths approximately half was scheduled for laying in the main line at DeWitt, Mo., about 35 miles west of Moberly. The other half was to be placed in track near Bement, Ill., about 20 miles east of Decatur, Ill.

In addition to the new rail to be welded into double and continuous lengths the road's rail program this year also calls for the welding of 112-lb relay rail into double lengths. A total of about 12 track-miles of rail are involved in this phase of the program. This rail will be cropped before welding so that the welded pieces will be 73 ft 8 in long. Most of this welded relay rail will be placed in the road's main track between Decatur and Moberly.

For carrying out the year's butt-welding program, the Linde pressure-welding setup was established at Moberly because of its prox-

Twin Production Lines Feature Unusual Pulling and Loading Arrangements

MAIN stations are in frame shelters. Welders shown here.

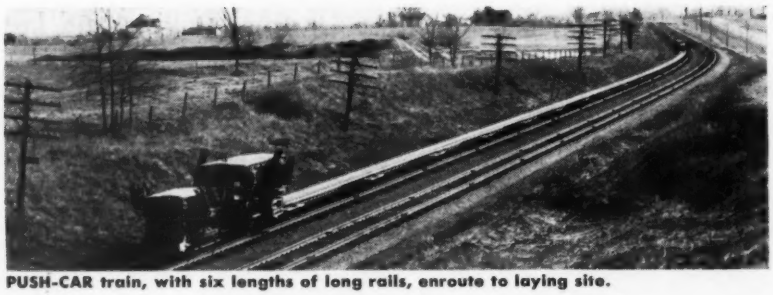
CABLE and hoist arrangement for pulling rails forward.

imity to those locations where the continuous lengths were to be laid. The production line consists of two complete pressure-welding outfits placed parallel with each other. The principal elements of each production line consist of a welding machine, a normalizer and two grinding stations. At the first grinding station the tops and sides of the rail heads are ground, while at the second the webs and tops and edges of the bases are ground. Magnaflux testing of the welds is done at the second grinding station.

Each production line has a separate line of rollers and the two lines of rollers are spaced 4 ft 4 in apart. The two welding machines are offset 9 ft from each other, thus making it possible to house them in a single shelter. Similarly, one shelter houses the two normalizers, and there is a shelter for each of the two pairs of grinding stations.

The only main station that does not involve duplicate sets of equipment is the operation in which adjacent rail ends to be welded are sawn so that the surfaces will be truly flush with each other. Only one saw—a Racine power hack saw—is used. The need for two saws is avoided by cutting two lines of rails (four rails) simultaneously. To allow storage space for sawn rails the center line of the main produc-

GANTRIES on broad-gage track aid loading of long rails on push cars. Note each gantry is carrying the forward end of a long rail as it comes from production line.



PUSH-CAR train, with six lengths of long rails, enroute to laying site.

Hauling and Unloading the Long Rails

The 663-ft rails on the butt-welding program of the Wabash for this year were scheduled for installation in two stretches near Moberly. For transporting the push-car trains from Moberly to the point of installation two Fairmont ballast drainage cars are used, one at each end of the train. At the installation site the long rails are first unloaded onto the ties between the existing track rails and are spiked at every fourth tie to keep them in position. The inside spikes are driven before the rails are unloaded. The rails are unloaded two at a time by pulling the push cars out from under them. In this operation the ends of the rails are chained to the track in the proper staggered position relative to each other. In preparation for shifting the rails to their final position, one length of each pair is cut as necessary for an insulated joint and the joint is applied. The insulated joint is applied in the other length after it has been placed in track.

The matter of placing the long rails in final position pretty much follows conventional practice: The joints in the old rails are unbolted and the rails are barred out by hand; the spike holes are plugged and the ties are adzed and new plates are placed; and a Burro 40 crane with a 55-ft boom is used to pick up the rail and set it on the tie plates. Adjacent lengths of the long rails are joined by standard 6-hole joints and are placed tight against each other. Anchorage for the long rails consists of Compression clips placed on the gage side. Eighteen clips are applied for each 39-ft length.

tion line is offset about 29 ft from the line of rollers through the rail saw. A separate storage bed for sawn rails, consisting of two transverse skid rails, is provided for each of the production lines.

Stock piles of rails to be welded are located adjacent to the head end of the production line. When they are to be welded the rails are taken from the stock piles by a crane and loaded on a string of three push cars. They are moved on these cars to the head end of the welding setup and unloaded by the crane onto a transverse storage bed from which they are barred onto rollers leading to the Racine saw.

How Rails Are Pulled Forward

Although the equipment in general is of a conventional nature a novel arrangement has been devised for moving the strings of rails forward on the two production lines. The problem of moving the rails is the same regardless of whether they are being welded into continuous lengths or into 78-ft lengths. When double-length rails are being welded adjoining rails on the production line are attached to each other by short splice plates, with a single bolt in each rail, so that these in effect become continuous lengths.

Power for pulling the rails forward is provided by a single divided-drum motor-driven winch, placed between the two production lines at a point between the normalizer and the first grinding station. The cable from the drum is reeved through sheaves placed in an A-frame slightly above the rails on the rollers and then extends along and above the production line to a point about 90 ft away in the direction of the welders, where it is reeved through two horizontal sheaves one above each line of rails. Fastened to each leg of the cable is a clamp for gripping the rail head. To pull one line of rails forward the clamp is applied to the rail head and the winch is started by a push button. As the one rail is moving forward the clamp on the other cable is moving back so it will be in position for moving the rail on that side. A klaxon-type warning system is used to alert the workers each time one of the rails is to be moved forward.

In electing to set up a double production line for its butt-welding operation, the Wabash had in mind particularly the savings that could be effected by operating the two lines with a fewer number of workers than would be required for two single production lines. The accompanying table shows the different operations, and the number of men used for them when new rail is being welded into continuous lengths. The table shows the operations from the sawing of the rail ends to the final grinding operation. It will be noted that the total of 20 men includes an operator and three laborers for handling the sawing operation. To keep up with the welders, it is necessary to operate an additional saw shift about every other day, so that in effect the total crew would come to about 22 men.

The important thing, however, is the fact that the total number of men used for the double production line is at least four less than would be required for operating two separate production lines. If the two lines were operated separately another laborer would be needed for feeding rails to the welders, a second welder would be

Organization for Operating Double Production Line When Butt-Welding New Rail Into Continuous Lengths

Operation	Number of Men
Sawing rail ends	1 saw operator 3 laborers handling rails
Feeding rails to welders	2 laborers
Making butt welds	2 welders 2 helpers
Trimming excess metal from welds	1 welder
Normalizing	1 welder
Pulling rails forward	1 winch operator (welder helper)
Grinding welds	6 grinder operators
Handling gas cylinders	1 laborer
Total	20

SHIFTING two long rails onto rollers for unloading.

UNLOADING starts as push cars move out from under rails.

required for the trimming operation, another welder would be required for the normalizing operation, and another winch operator would be needed.

When welding rails into double lengths, the organization shown must be augmented by a few additional men for use as pushers, and if relayer rail is being welded two men must be added for cleaning dirt and grease from the rail ends. Nevertheless, the double-line production setup affords the same cost savings for double-length welding as for continuous welding. It is this factor which the railroad feels is responsible for getting the cost per weld down to an exceptionally low level. And, as stated earlier, additional changes in the production lines are contemplated, which are expected to reduce the cost even further.

The railroad also feels that the production record of the double-line setup is satisfactory. Production has run about eight welds per line per hour.

When double lengths are being produced, the welded pieces are loaded directly into open-end gondolas as they come from the production line. The practice when loading a double length is to use a spreader arrangement with a rail tong at each end, and the rail is placed in the gondola so that the excess length extends onto an adjacent flat car. The railroad estimates conservatively that the double lengths can be laid at least 25 per cent faster than 39-ft rail. The 663-ft lengths can be laid at a considerably greater speed.

Use of Special Push Cars

The use of special push cars for hauling the 663-ft rails to the site of installation is one of the interesting aspects of this road's butt-welding operations. The push cars used are Fairmont cars with a capacity of 10,000 lb each. There are 36 such cars which are used in two sets of 18 each, so that when one set is being used for transporting the long rails the other set is being loaded at the butt-welding setup.

Each of the push cars is provided with a roller on each side to permit the loading of the two strings of rails as they come from the production lines. Fastened transversely to the bed of each push car between the rollers is a heavy steel angle section onto which the long rails are barred after they have been pulled into their final position. Each string of push cars accommodates six lengths of the long rails.

When in position for loading at the end of the production line, the push cars are spaced 35 ft apart and are coupled together by lengths of ½-in steel cable to maintain the proper spacing while the rails are being pushed onto them. In this operation two special gantries are used which operate on rails having a gage of 75 in so that the gantries straddle the push cars on the loading track. Each gantry operates on four flanged wheels and has an A-frame at each end which support a cross member at the top.

As the end of one of the long rail comes from the production line, it is fastened in a somewhat raised position to the crossbeam of one of the gantries so that it will not sag when moving between push cars. For fastening the rail to the gantry a heavy chain and load binder is used with a clevis at the lower end and with the pin of the clevis extending through a bolt hole in the rail. As the rail is extended progressively out over the push cars it carries the gantry with it. When a rail has reached the end of its movement, the gantry is detached and rolled back to the end of the production line to pick up the next rail.

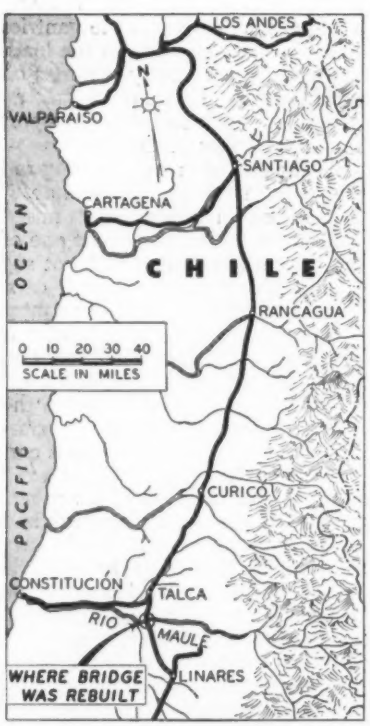
The general layout, including the design of the pulling arrangement, was made by R. S. Stephens of the Wabash engineering department. The operation of the plant is under the direction of E. W. Knight.

A short work season between flood periods posed a difficult erection problem in bridging the Maule river in central Chile. Engineers of the Chilean State Railways solved the problem by erecting one-half the structure back of each abutment and then pulling the sections across the river until they met on the center pier.

FORWARD END of bridge reaching for the next pier during pulling operations. Maximum unsupported length—shown here—was 164 ft.

Echo of Wartime Practice . . .

Long Bridge Goes in Lengthwise



Difficult Railroading in Chile

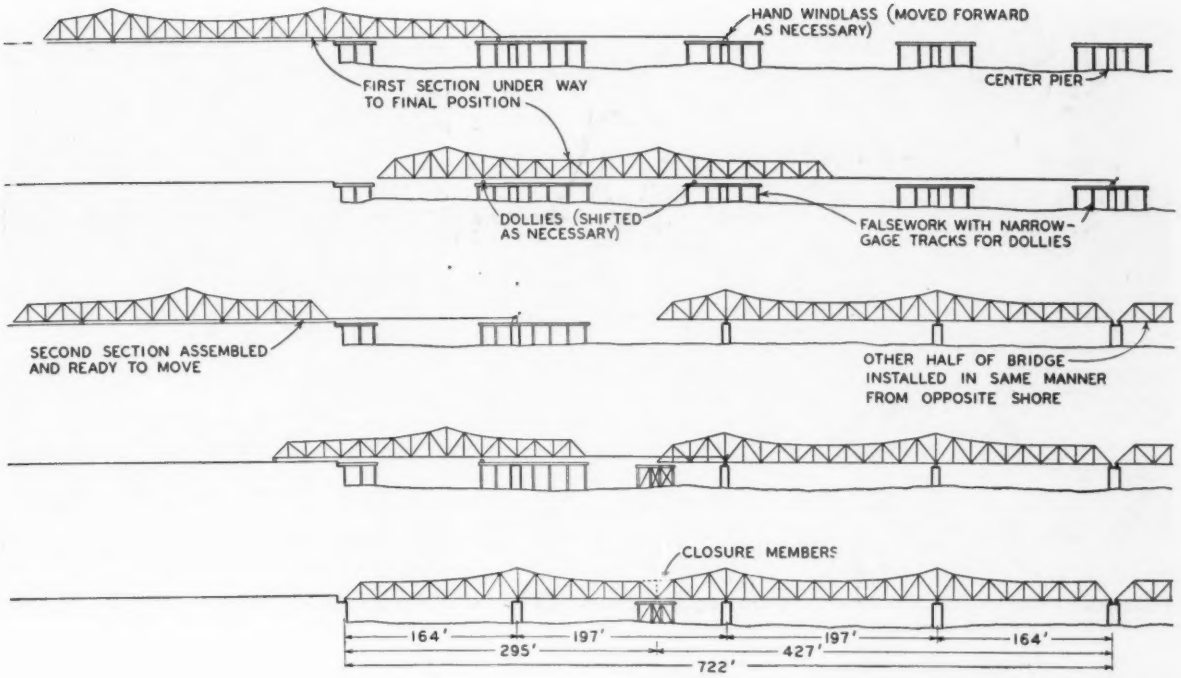
The Republic of Chile, 4,350 miles long and only 125 miles wide, stretches like a shoestring along the southwestern edge of the South American continent from the tropics to the Antarctic ocean. Squeezed as it is between the Andes mountains and the Pacific ocean, it is crossed by many wide, swift rivers which carry the melting snows of the mountains to the sea.

The generally mountainous terrain and the numerous streams create difficult construction and maintenance problems for the Chilean State Railways. In so far as bridge renewal and improvement projects are concerned these problems are complicated by a short working season between heavy winter rains and summer floods caused by the melting ice and snow in the mountains. This condition has directed the ingenuity of the engineers toward devising construction methods which will make the most of this short work period. The replacement of a bridge over the Maule river in central Chile affords an example of the problems encountered and of the high order of skill that is brought to bear in solving them.

● Remember the Bailey bridges of wartime fame? They were erected on shore and pushed out over the stream, and they were the answer to an engineer's dream when the erection job had to be done fast.

The same general erection procedure was recently employed by railway engineers in South America, and for the same reason—they were short of time. But there the analogy ends. The structure in South America is long (1,444 ft), even for railway bridges, and it is a permanent bridge of attractive design. And the need for speed of erection came about because the job had to be done between seasonal flood stages in the stream.

The project was carried out by the Chilean State Railways at a point where a single-track line crosses the Maule river in Central Chile. The original bridge at this location was constructed about 70 years ago. It consisted of a series of steel spans with an overall length of 1,312 ft. Thirty years ago this bridge was strengthened and reinforced to carry increased



VARIOUS STAGES in the movement of one-half the bridge to its final position are shown by these diagrams. Each half was erected and shifted in two sections. When in their final position the two parts were joined (dotted lines) into one continuous structure.

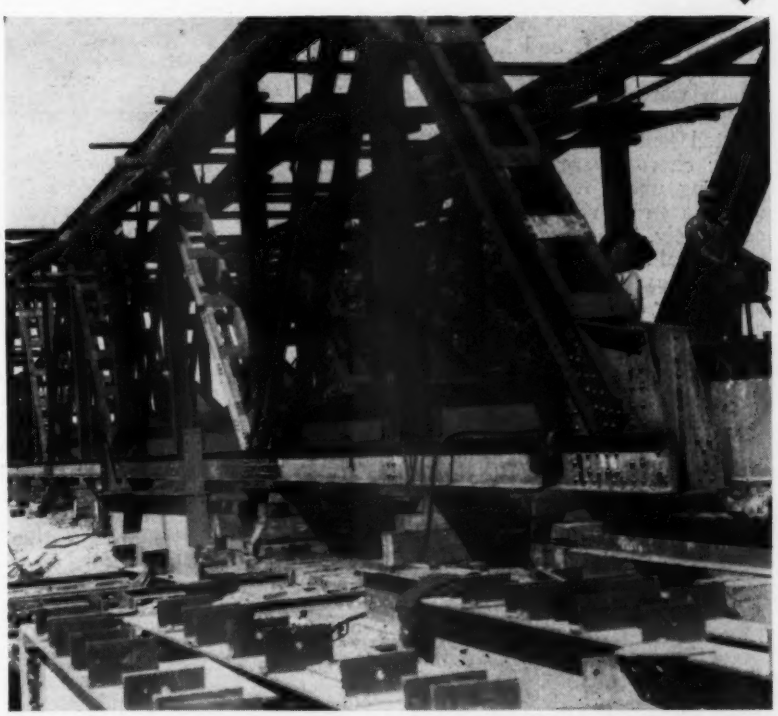
speeds and loads. Recently it became necessary to replace the bridge as part of a line-improvement program.

Because of the short working season between seasonal floods, sufficient time was not available to permit the erection of the new bridge in the conventional manner, using falsework. For this reason it was decided to erect the bridge on the approaches, back of the abutments, and then pull it into position longitudinally. This was possible because the new bridge occupies a position parallel with the old structure.

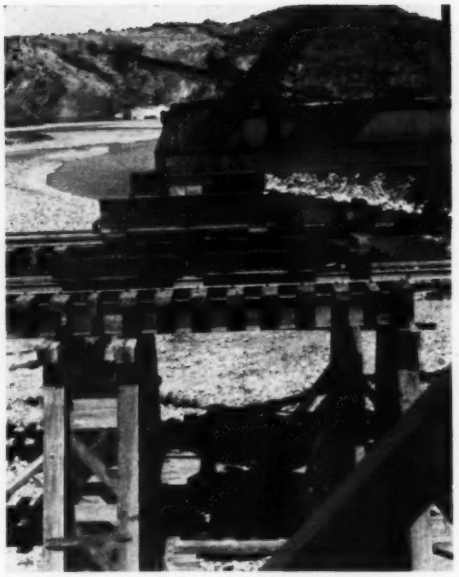
The proposed method of installation contemplated that a considerable length of the new bridge at the forward end would be unsupported during the erection procedure as it was being pulled between successive piers. Doubtless this consideration was a factor in determining the type of structure to be erected. The structure chosen is a truss bridge continuous over the piers. This explains why the trusses reach their maximum depth at the piers and their minimum depth at the mid-points between piers. Top lateral bracing is provided in only two panels at each pier; elsewhere the trusses are of the pony type.

The bridge is in two continuous sections, each 722 ft long, the adjoining ends of which are supported on a pier in midstream. Each section has four spans and is

DURING ERECTION lower chord was supported on timber blocking. Each section was riveted up completely including the placing of floor and top-lateral systems.



FALSEWORK being erected around the first pier to support narrow-gage tracks which will carry dollies used during moving operation.



DOLLIES were of heavy construction and were moved from point to point as required.

supported on three intermediate piers. The piers and abutments are of concrete and the piers, extending 46 ft below the bed of the river, were constructed with the aid of pneumatic caissons.

To expedite the work it was decided to erect the two sections of the bridge simultaneously, one on each shore of the river. The tailroom available for erecting the sections behind the backwalls was not long enough to accommodate the full 722-ft length. Each length was accordingly divided into two sections of 427 ft and 295 ft, respectively. The longer sections, which were to occupy the space at the center of the channel, were erected first. During erection the lower chords were supported by blocking under each panel point and the structure was riveted up completely, including the floor and top lateral systems.

After each section had been completely assembled on the bank, a narrow-gage track was laid under each truss, and the track was extended on falsework a short distance ahead of the abutments. Falsework was also erected on both sides of each intermediate pier to carry similar sections of narrow-gage tracks. The falsework consisted of a series of frame bents supported on a solid timber grillage laid on the dry bed of the river. Stringers of rolled I-beam sections spanned the space between the bents. These stringers supported the ties and rails of the narrow-gage tracks.

Dollies, mounted on double-flanged wheels, were provided to operate on the narrow-gage tracks and to support the bridge section during the moving operation. Two of the dollies were required at each supported panel point, one under each truss. The location of the dollies was varied, in a pre-arranged sequence, from time to time as the section was moved ahead. This was done to provide support at the various piers as the section progressed and operating conditions varied. The power for moving the bridge was supplied by a hand windlass which was installed initially on the second pier from the abutment and was then moved ahead to the center pier in three stages.

The first and longest pull was made until the end of the section was over the falsework at the first pier. From this point onward, pulls were made in 33-ft and 66-ft increments until the section was over its final location. The dollies were then removed and the section was lowered to bearing on the piers with the aid of four 200-ton hydraulic jacks.

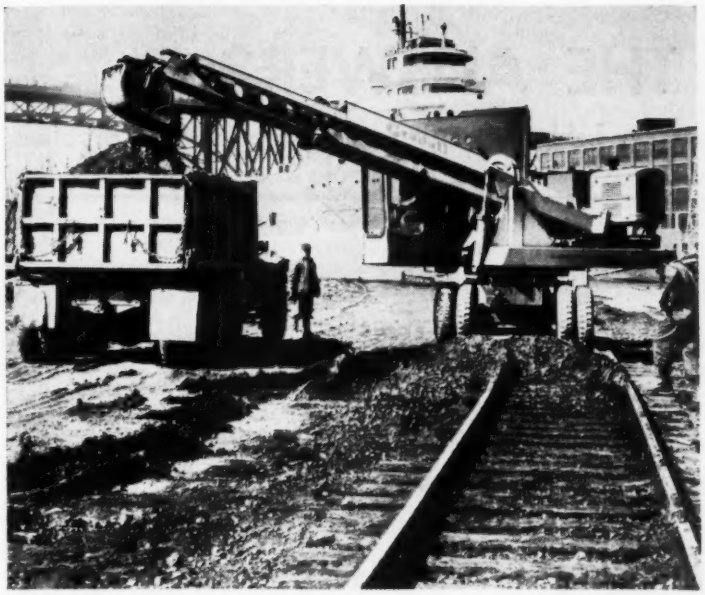
After the first section of each span had been set, the remaining section was erected on the bridgehead in the same manner as the first, and was moved to position following the same procedure. Since the point of juncture between the two sections was located between piers, falsework was constructed to support the ends while the connections were being made.

An important point which was taken into consideration in designing these trusses was the effect of stresses produced during the moving process. These stresses were due to the changing points of support and the cantilever effect created by the overhang of the ends.

This important project was carried out by the Track and Works Department of the Chilean State Railways under the general direction of the head of this department, don Diógenes Córdova F. The structure was designed by the chief engineer of the works service, Juan Meyer L. The trusses were fabricated and fitted in the bridge shop of the Track and Works Department at Santiago under the direction of Ramón Saenz E., and were then dismantled and shipped to the bridge site. Erection and installation of the spans was under the direction of the sub-chief of the track and Works Department, Juan Saitúa Toledo.

Acknowledgment

During a recent visit to South America, and while traveling over the Chilean State Railways, Max K. Ruppert, president of Poor & Co. and of the P. & M. Co., was impressed by the methods being used to renew a bridge over the Maule river. Believing that railroaders in this country would be interested he took photographs and requested the engineering officers of the Chilean Railways to provide him with descriptive data. When Mr. Ruppert offered the material to this magazine for publication it was promptly accepted. His cooperation is hereby acknowledged.—Editor

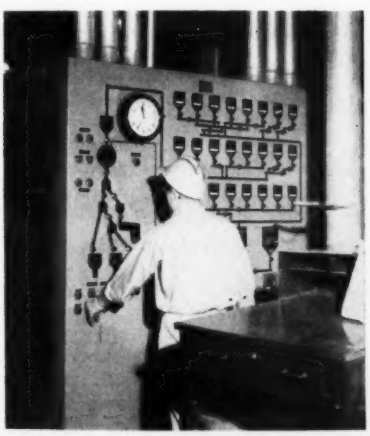


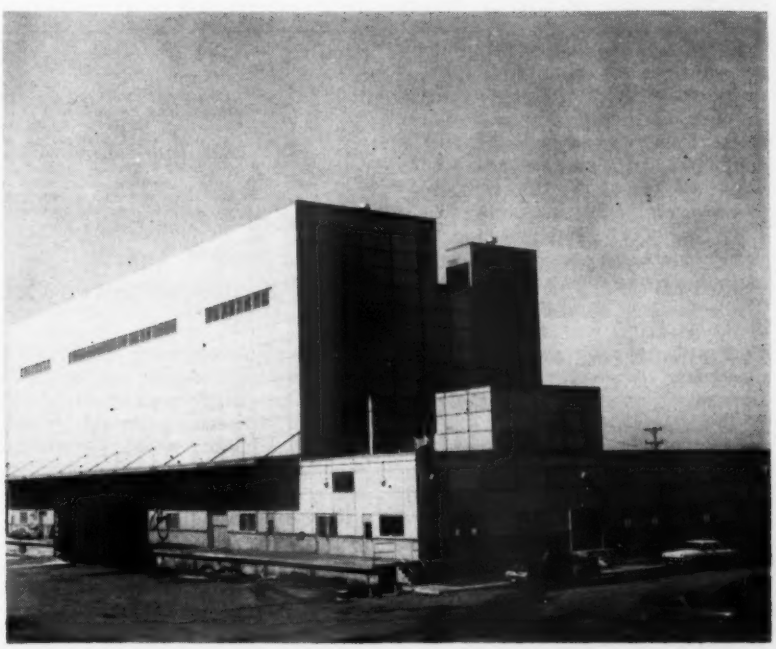
SPECIALLY equipped Gradall, built for the Pennsylvania, has an auxiliary 12-v generator to provide power for extra lights when working at night on emergency jobs.

CLEAN UP job is handled by a Warner & Swasey Gradall. Machine was used to remove material from shoulder and from between rails and ties. Bucket teeth were removed for a more finished job.

News Briefs in Pictures . . .

RUBBER grade crossing (right), manufactured by Goodyear Tire & Rubber Co., is installed on the Western Maryland. The crossing consists of rubber slabs supported by steel members embedded in the rubber and is bolted to the crossties.





NEW PLANT of the Dearborn Chemical Company at Lake Zurich, Ill., features manufacturing processes that are almost entirely automatic. The "heart" of the plant is an electrically-operated control panel (above) which works in conjunction with automatic weigh-scales. To compound a product, the scales are set and control panel activated. The ingredients are then fed from the proper bins and the operations proceed automatically.

WHAT'S THE ANSWER?...

. . . a forum on track, bridge, building and water service problems

Restoring Openings Under Bridges

Where the accumulation of silt and other material has reduced the waterway opening under a bridge below that required by the drainage area what are the most effective methods of restoring the opening to the required size? Explain.

A Problem in Three Categories

By Frank R. Woolford

Chief Engineer, Western Pacific, San Francisco, Cal.

The accumulation of silt and debris in waterways has been a continuous problem to engineers. The experience gained on this subject in the past year by the railroads has been such as to run the gamut of types of conditions that could occur on a variety of structures.

The problems, particularly in the case of large bridges, usually fall into three categories when silt or debris are involved:

1. Silting upstream, under the structure, or downstream. This results in the erosion or undermining of piers or abutments in other portions of the structure due to increased velocity or change of hydraulic gradient.

2. Silting or filling of underclearance of structure. This results in the inability of opening to carry the designed water flow, with consequent flooding of valuable adjacent land upstream, and the probability of loss of the structure, due to water and debris pressures.

3. Neglect in not clearing silt or debris, or performing other maintenance of the channel may result in changes in alinement of the channel. Land of adjacent landowners is thereby gained or lost upstream or downstream and riparian rights changed through accretion.

Many methods may be used to reduce the silt problem. In some cases obstructions downstream from structures change the hydraulic gradient and impede flow. This results in the dropping of silt in the bridge structure area. These obstructions should be removed if silting is occurring.

In some cases where streams angle through structures, the velocity of flow is reduced, resulting in the depositing of silt and the formation of sand bars. To remedy such a condition, the stream should be realined through the structure. In many other cases where debris and miscellaneous vegetation are allowed to accumulate around the structure, a silt build-up condition results. To eliminate such stream blockages, the streambed under and upstream from the structure should be cleaned periodically, deepened and properly maintained.

The spacing and placement of bents or piles can also adversely affect the depositing of dirt and silt. Special attention should be given to the location of bents in rebuilding openings so that the supports will be angled with the flow of water and be spaced as far apart as practicable. The lining of the bottom or the flow line of the stream through the structure and for a distance on either side is in many cases effective in preventing the depositing of sand or silt. Riprap of various kinds can also be used quite effectively to change the flow of streams, protect piles and abutments, and prevent excessive scouring once the accumulation of silt is removed from the channel.

The construction of training walls or deflecting structures to guide the flow of water through structures is very effective in preventing dirt accumulation. We have used several debris catchers, constructed of scrap rail, placed upstream from a drainage structure to prevent debris and silt from reaching the ravine section of the bridge and clogging up the structure. The construction of sedimentation basins at the entrances and exits of small structures for hand cleaning can also be provided.

Once we permit silt and other

Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, Railway Track and Structures, 79 W. Monroe St., Chicago 3, and reach him at least five (5) weeks in advance of the publication date (the first of the month) of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered in the October Issue

1. To what extent are the railroads warranted in widening the subgrade shoulder to permit greater use of off-track maintenance equipment? Explain.

2. What are the minimum ventilation requirements of shop facilities used for the painting of diesel locomotives and cars? How can these requirements best be met? Explain.

3. What is the best method of lining the curved closure rail of a turnout to fit the offsets shown on the standard turnout plan? Explain.

4. When pouring bearing areas for the support of bridge or column loads, should the concrete masonry be cast high and bush hammered? Poured to exact elevation? Left low and grouted? Explain.

5. To what extent is it permissible or good practice to supply water, treated for boiler or cooling purposes, for general use in railroad buildings? What restrictions should be placed on the use of such water? Should allowable uses be labeled at the outlets? Explain.

material to be deposited under, up, or downstream of the structure, one must use one of the many methods to remove the obstruction. If there is sufficient headroom, a "dozer" is the most effective and economical unit for cleaning out material to the flow line. In cases where a dozer is not suitable, a backhoe or Gradall machine can be used. These machines can reach into the limited space and remove the material from the channel. Debris should be deposited on the banks a sufficient distance away from the structure to prevent it from again reaching the channel.

Another most useful unit of equipment is a dragline, which can be used most efficiently both upstream and downstream. Such a machine has proven most economical and efficient for our use. A clear channel on both sides of the structure, for a considerable distance each away from the actual crossing, is most necessary.

Finally, the section forces should be instructed to remove all silt at least annually, if not more often, from all small-opening structures. When such a plan is carried out on a continuing basis, we have found a great improvement in the performance of the openings.

The fundamental principle in the control of silt or debris in openings on any railroad is that any accumulation of this material in an opening should be programmed for removal annually.

Raise Grade of Track

By J. P. Dunnagan

Engineer of Bridges, Southern Pacific, San Francisco, Cal.

Where a culvert is subject to silt accumulation, it is an indication that the base of rail is too close to the natural ground line. The only effective way of correcting such a condition is to raise the grade with corresponding increased height of opening.

A great deal depends upon the type of silt. Soil and light-silting conditions may be temporarily corrected by providing some type of hydraulic inlet that would have a tendency to reduce the area of the structure temporarily but increase the velocity of the stream. This would tend to produce a flush-out effect. However, this is only a temporary measure and would, no doubt, require cleaning after each major storm.

If the silt or sediment is of a gravelly nature, much difficulty is incurred in trying to build up sufficient pressure at the upstream end to carry the deposit through the structure.

If the structure is large enough it can be cleaned out quite effectively by use of a dragline or skip loader, or some other mechanical equipment. However, this method builds up to a regular maintenance job. Therefore, the most satisfactory method of eliminating silt in culverts is to raise the grade and increase the height of the opening.

Height of Bridge Governs Method

By R. J. Gammie

Chief Engineer, Texas & Pacific, Dallas, Tex.

The method of removing silt and other material from under a bridge depends on several things. Primarily it depends on the height of the bridge. If the bridge is high enough, it is a simple matter to remove the silt with a bulldozer. If it is not high enough to work a bulldozer under it, the method which we prefer is the use of a front-end loader. This is used by loading it under the bridge and dumping it at some convenient place. Of course, if there is water under the bridge, that brings on another condition and it is sometimes necessary to use a dragline or equipment of that kind.

A man who has any resourcefulness about him can figure out the best method for doing this work if it is put up to him.

Three General Methods

By H. E. Wilson

District Engineer, Atchison, Topeka & Santa Fe, Topeka, Kan.

There are three general methods of removing silt or other material from bridge openings. These are:

(1) By hand
(2) With machines
(3) Sluicing

The hand method is usually most expensive, and consequently the least desirable. However, in some cases it is about the only feasible one. This is especially true for boxes or pipes with small end areas; or where it is necessary to open a pilot channel or remove enough material to provide space for one of the various machines to work.

There are a number of different machines which can be used for removing material from bridge openings. Those most commonly used are: Sauerman bucket, front-end loader, bulldozer (with or without scoop), dragline, power shovel, trucks, and conveyors.

As indicated above it is usually necessary to remove some material by hand to provide enough room for the machines to work. Any one of the machines listed, or any combination thereof, may be used, depending upon local conditions. Usually one of the other machines will be needed to dispose of the material after it has been removed from the bridge opening when the Sauerman bucket is used. The manner of using front-end loaders, bulldozers, scoops, draglines, shovels and trucks, as well as their capabilities and limitations, are so well known that a detailed description is not needed here.

There are two different types of conveyors which can be used. These are: (1) A simple conveyor mounted on a frame on skids; and (2) a self-propelled conveyor such as some of the track-cleaning machines, or elevating graders. In all cases it would be necessary to feed material by hand onto the non-self-propelled conveyor. This is also true in most cases for the self-propelled conveyors, for it is unlikely that the material would be loose enough, or the machine powerful enough to permit self loading. One of the other machines would be required, for use with any of the conveyors, to dispose of the material after removal by the conveyor. Where solid footing is available trucks would work well.

The third method, that of sluicing, is used less frequently than the others. But, when the material to be removed is suitable, when water and pumps are available, and the gradient and other conditions satisfactory, this method can be very effective.

In somewhat rare cases, where the stream channel requiring cleaning flows into a larger stream a short distance downstream, the current of the stream itself can be used to remove the material. This is done with the aid of a pilot channel, provided the water level in the larger stream is low enough when the first run of water occurs in the channel needing cleaning. If the larger stream happens to be high, further deposition of silt will

probably occur in the smaller stream. Therefore, this latter method is dependent upon luck, and can seldom be considered.

The local conditions at each individual bridge, such as headroom, character of material to be removed, depth of channel, gradient of stream, opportunity for disposing of material removed, and many other factors will determine the most effective and economical method to use.

At best the improvement effected by removing material from bridge openings is usually temporary. It is usually the gradient of the stream, or the proximity of its outlet into a larger stream, that are the cause of sedimentation. These conditions can seldom be permanently cured by cleaning the channel. Sometimes the only effective way to secure increased waterway is by raising the grade of the track. Even then, there is no assurance of a permanent cure.

Frequency of Out-of-Face Surfacing

How often should track be surfaced out of face? Does the type of ballast affect the frequency of surfacing? Why? Explain.

Suggests 3-Year Average

By J. R. Scofield

Deputy District Engineer,
New York Central System,
Detroit, Mich.

The frequency of surfacing track out of face depends on traffic density, speed, age and condition of rail, kind and condition of ballast, drainage, nature of roadbed, joint conditions—including the necessity of welding and grinding—center-bind, and preventive maintenance required in the form of spotting and lining. There is no question that higher speeds and heavier loads emphasize the importance of shortening the track-raising cycle. First-class passenger lines require better riding conditions than those on which only freight trains operate.

Before track is raised, ties should be good, ballast should be cleaned, joints should be put in good condition where necessary, shoulder should be brought to the proper height to hold the ballast line and good drainage should obtain.

With no deferred maintenance and a program of raising track on an established cycle basis to prevent center-bind, track should be given a ½-in lift and tamped with a low-lift machine. Bolts and anchorage should be checked as the work progresses. This should be followed up in about four weeks by machine spotting to catch any irregularities that may have developed and to "cinch" and give necessary refinements to the surface in order that the track be "laid by" properly.

For ordinary good maintenance we have found the less the raise the more economical the work. The ballast must be of the correct size and placed properly under the ties. Provided the work is properly done, it will hold better than where a higher lift is used and, at the same time, will diminish the expense of unloading additional ballast.

The frequency of the track-surfacing cycle, where stone or crushed slag is used and where there are high-speed passenger trains and an average total of at least 24 mixed trains a day, should average three years. With gravel, cinder or other inferior ballast, tamping should be done every two years to obtain the same results under these conditions. This is because of the greater tendency of this type of ballast to become foul.

Good spotting procedures can lengthen the tamping cycle. But we have found that track can be surfaced out of face for at least the same cost as a good spotting job and this, at the same time, gives more uniform and better results.

Many Factors in Time Element

By J. T. Shepherd, Jr.

Roadmaster, Norfolk & Western,
Buena Vista, Va.

Track must be resurfaced when surface conditions cannot be satisfactorily maintained by smoothing. When track becomes center-bound, and/or cross level and joint conditions become unsatisfactory, there is no remedy short of rebal-lasting.

There are many factors which determine the time element. Eliminating the necessity of surfacing track to make heavy tie renewals, we will confine our observations to ballasting on account of surface conditions only. This ballasting is governed by a number of local conditions such as: (1) traffic; (2) grade; (3) general drainage; and (4) type of ballast used.

Heavy-traffic track must be ballasted more often than track on light-traffic lines. Track carrying heavy coal traffic will, to a certain extent, become fouled by fine coal leaking and blowing from open-top cars. This fine material clogs the openings between ballast particles thus setting up sloppy conditions whenever the track may be pumping. Lime, stone dust, etc., likewise tend to affect the ballast condition. The traffic time element varies in certain locations. Some heavy-traffic track will average a lift every four years. Some other track may require more and some less as the case may be.

Track on a heavy grade that requires pushers frequently becomes foul with sand from the engines. This hinders drainage and sets up bad ballast conditions.

General drainage is the most important single item on any railroad. Side ditches must be kept open so that the drainage may be carried away from the track quickly. Otherwise, the subgrade will become soft and the surface impaired. This item cannot be stressed too strongly.

The type of ballast used is very important. Of necessity, ballast quarried locally is most generally used but this varies with the location. Limestone is an excellent ballast and is perhaps most generally used. It should be large enough to provide good drainage, but small enough to be tamped under the ties readily when smoothing track. I find ballast which ranges from ½ in to 1½ in ideal for medium traffic. Screenings or chat may suffice for very light traffic. These are the easiest to smooth up but deteriorate rapidly. The reason for this is obvious since the openings between the particles, being small, clog up quickly and the effectiveness of the ballast for drainage is lost.

Sandstone makes good ballast but is not as easily worked as limestone. Blast-furnace slag when processed to standard size is very good ballast. However, under heavy traffic this type of ballast tends to cement together and track must be reballasted more frequently than with stone.

Many lines are maintained on gravel. This is adequate if enough crushed gravel is included to prevent rolling. In other words the ballast must have enough sharp edges to prevent the track from getting out of line. Often the berm must be so wide, to prevent bad alinement, that drainage is hindered. However, such ballast is economical in some places and has the general advantage of being readily spreadable on the roadbed previous to a general track raise on new ballast. Plant processed stone would be too expensive to waste in this manner.

In the final analysis, it would seem that good crushed stone would last longer under any type of traffic. It lends itself readily to cleaning and reuse and is thereby cheaper in the long run though the first cost may be higher.

Definite Answer Impossible

By W. M. S. Dunn

Staff Engineer, Chesapeake & Ohio, Huntington, W. Va.

It is completely impossible to make a statement as to how often track should be surfaced out of face. This is due to the many variables which are the basis for doing this work.

Some of the factors which must be considered in the surface life of track are:

(1) Millions of gross ton miles carried per year.
(2) Rail condition.
(3) Drainage condition.
(4) Speed over track.
(5) Type of tonnage handled.

There are many other considerations too numerous to mention.

In general it is safe to say that track should be surfaced out of face when it becomes necessary to "skirmish" or smooth joints and other parts of track excessively. It should be surfaced before it becomes apparent that the rail is irreparably damaged by poor surface, cross level or line conditions.

It is my belief that the best type of ballast to use for heavy-tonnage track is either limestone, slag or granite. This should be sized and screened to suit particular needs. I have seen track ballasted with chats. This, in my opinion, makes a superior type of ballast because of the density and weight of the ballast section. Washed gravel makes good ballast under certain conditions but certainly is not conducive to good surface conditions on railroads which have heavy and fast traffic. This is due primarily, I believe, to the fact that it is rather difficult to stabilize and hold washed gravel ballast in the ballast section.

Locating Underground Pipe Lines

When there is no record of the location of underground water mains or other pipe lines, what is the most effective method of establishing their location? Explain.

Uses Modified "Divining Rod"

By W. P. Clark

Supervisor of Bridges & Buildings, Lehigh Valley, Wilkes-Barre, Pa.

We have had some experience, as well as some difficulty, in locating water mains and other water lines. Of course, this condition is now greatly diminished due to the changeover from steam to diesel engine operation. Practically all of the outlying watering stations have been eliminated, leaving only watering facilities at stations and terminals. However, it is still a problem, especially in large yards, not only to locate the lines themselves, but to locate the valves controlling branch lines from the mains.

Sometimes it is possible to locate an old map showing the valves and mains, but generally no record was made of branch lines. It is then a case of calling on someone's memory. Of course, with diminishing forces it quite often happens that there are no employees around who remember when the installations were made. At times, it is possible to locate a line by operating valves at various locations by trial and error until the correct line is found.

We have used an instrument which operates similarly to a stethoscope used by a doctor. Although this device is generally used for locating leaks in lines we have had some fair results with it in locating the lines themselves. On one occasion we located a leak 12 ft under an old road, which had been filled time and again. We have also located leaks in lines in our station platforms with it. It can only be used when there is no interference from outside noises, such as result from passing trains or switch engines operating in the vicinity.

The most successful device we have used is a homemade instrument, patterned after the divining rod. This has been most successful, and at the time of this writing we are using it to good advantage in installing 800 ft of new 1½-in water line parallel to and crossing over a large wood water conduit. It is necessary to know just where this wood line is at all times so that it will not be damaged with the mechanical digger we are using. We have no plans showing the location of this line and have located and staked it off with this device.

The device is made from two pieces of iron or steel wire, No. 8 or 9 gauge preferably, approximately 18 in long, and two copper line sleeves 4 to 6 in long, or similar pieces of copper tubing. Each piece is formed in the shape of the letter "L." The bottom or short part of the "L" is inserted through the copper sleeve or tubing. The wires must be free in the sleeves and able to turn by tipping them. Each sleeve is gripped tightly in a vertical position, one in each hand, so the longer part of the "L" points directly away from the body on a level plane and is parallel to the other. The fists are held together tightly and the user then walks with a heavy shuffle, so the feet scrape the ground. When the device is directly over the pipe or a flow of water the rods will open outwardly, or away from each other.

If there is more than one line each line will indicate its location. However, this interference can generally be worked out by starting at known locations on any of the lines.

Minimum Weight of Rail in Hump Yards

What factors should determine the choice of the minimum weight of rail to be used in the leads of hump-retarder yards? The body tracks of such yards? Explain.

Use Heaviest Rail Available

By D. C. Hastings

Superintendent, Potomac Yard, Richmond, Fredericksburg & Potomac, Alexandria, Va.

Continuous uninterrupted operation of a hump-retarder yard is essential. In order to realize these savings, the track structure through the limits of the switches and the retarders should be constructed to main-line standards. No rail of a weight less than 130 lb per yd should be used in this area. It is entirely possible that sections heavier than 130 lb could be used if the individual road maintains a supply of such material for main-line usage and does not normally stock 130-lb rail for such purposes.

Not only should heavy rail be used through the limits of the switches and retarders, but this track should also be constructed with main-line ties and timbers and surfaced on at least 6 in of good crushed-stone ballast, preferably of the smaller size. This is necessary in order that the area between the tracks through the limits of the switching leads will provide suitable footing for train-service employees.

The chief reason for selecting a heavier rail is to eliminate subsequent maintenance of those areas which must be kept in constant operation. Switching leads constructed with 130-lb rail, properly surfaced, will require a minimum of maintenance; therefore, the resulting interference with the classification of freight will be minimized.

Since the movements made over the body tracks of the yard are not as frequent as those through the switching leads, it is not necessary to have a rail section in the body tracks as heavy as that used on the hump leads. It is essential, however, that the rail used in body tracks should be of a heavy enough section to minimize the amount of maintenance required subsequent to the original installation. Body tracks should certainly be constructed of at least 100-lb rail and particular attention should be paid to the joints in order to eliminate subsequent maintenance, since the surfacing of body tracks always interferes with the classification of freight.

It is feasible to consider continuous-welded rail in the body tracks of classification yards to eliminate rail joints. This has recently been done by one of the larger railroad systems in the east. Of course, such an installation will require a considerably higher initial capital investment. However, the subsequent savings in man-hours of maintenance should definitely show that such additional expense is justified.

Illuminating Diesel-Servicing Facilities

What are the minimum standards of artificial illumination for outdoor diesel-servicing facilities? Indoor? What types of electrical fixtures are best adapted to provide this illumination? Where should they be installed?

Good Lighting a Morale Builder

By B. D. Allison

Electrical Engineer (Fixed Property), Chicago & North Western, Chicago

The C&NW is a firm believer in adequate lighting, the amount and type of lighting depending on the services performed under it. We know that the more effective the lighting the greater is the safety factor which eliminates fear of accident in the man performing his duties. With good lighting a greater degree of efficiency can be expected from the worker. Good lighting is also a morale builder and will produce a happier group of employees and a better quality of work.

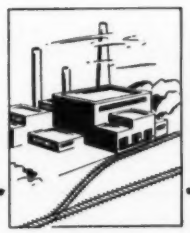
For outdoor servicing of diesels, such as sanding, watering and fueling, a minimum of two foot candles of lighting should be used. There are many types of lighting units on the market today which can accomplish this end. The track clearances between servicing tracks would be the factor determining the type of unit required. We are using the mercury-vapor street lighting units with a EH1 lamp of 400 watts. In many locations we also use the shovel-nose and elliptical porcelain reflector to get the desired results. In a close clearance area we use floodlighting units mounted on poles, buildings, etc. We generally use a fan-divergence lens to give a good quantity and quality of spill lighting to eliminate the glare.

For indoor lighting, such as is required in a filter-cleaning room in a diesel shop, we use a vapor-proof fixture, installing enough units to give an overall reading of 10 foot candles. The small parts area in a diesel shop works out very well with an enclosed double 40-watt lamp fixture mounted 9 ft from the floor. Enough units should be used to give a minimum of 30 foot candles.

For the heavy-repair section of a diesel shop where overhead cranes operate, incandescent or mercury-vapor fixtures, or a combination of the two, are the only answer. A dust-tight fixture or a fixture using a reflector-type lamp will suffice. The minimum lighting should be no lower than 25 foot candles, and sufficient fixtures should be installed.

In the servicing-platform area, for running inspection and light repairs, fluorescent fixtures are the best answer. The upper platforms should have a minimum of 25 foot candles. For lower areas, where inspections are made of the running gear, etc., 30 foot candles should be the minimum. These fixtures should be mounted on an angle to put all the light on the running gear.

Tunnel lighting should be used in the pits. This illumination should be mounted to direct the light up under the diesel units and the units should be spaced to give a minimum of at least 10 foot candles. Shops and offices should have fluorescent fixtures, properly spaced to give an overall minimum of 30 foot candles.



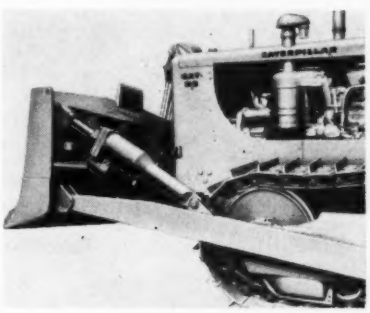
PRODUCTS OF MANUFACTURERS . . .

. . . new, improved equipment, materials, devices

BACKHOE HAS TRACTOR MOBILITY

A HYDRAULIC BACKHOE, designed for use on Caterpillar D4 Tractors, is capable of digging to a depth of 13 ft and loading up to a height of 9 ft 7½ in. A rack and gear swing mechanism, operating in an oil-tight case, provides a full power swing at uniform speed throughout a full 240-deg arc. Full track oscillation is said to be maintained through the backhoe's equalizer arrangement. A pivoting equalizer beam allows the backstay struts to move with the tracks as they move up and down when traveling over an uneven terrain. The unit is equipped with retractable hydraulic outriggers to provide stability while digging.

Dippers for the backhoe are available in cutting widths of 13, 21 or 29 in and have replaceable alloy steel points crimpd onto adapters from the bottom. *Hyster Company, Dept. RTS, 2902 N. E. Clackmas St., Portland 8, Ore.*



TILTING ATTACHMENT FOR DOZER BLADES

A HYDRAULICALLY actuated bulldozer tilting attachment increases the versatility of tractors on such jobs as ditching, building roads on hillsides, digging rocks, and other applications requiring frequent tilting of the blade. Designed for use with No. 8S and 9S bulldozers, a large hydraulic cylinder replaces the left bulldozer blade brace. With the righthand brace adjusted to its neutral position, it is said that either corner of the No. 9S blade can be raised approximately 28 in above ground level by retracting or extending the tilt cylinder. On the 8S blade, this figure is approximately 24 in. Additional tilt may be obtained by extending or retracting the screw-type righthand brace.

The tilt cylinder is controlled from the operator's seat by a front-mounted No. 44 hydraulic control or the new rear-mounted No. 48 hydraulic control. The hydraulic pump is mounted on and driven by the engine rear power take-off. The No. 48 hydraulic control is also used to operate the No. 8 ripper and a double valve arrangement is available for the combined operation of the ripper and tilt cylinder attachment. *Caterpillar Tractor Company, Dept. RTS, Peoria, Ill.*

GASOLINE POWDERED COMPACTION TOOL

A PORTABLE, gasoline-powered tamping tool combines positive impact, imparted by high speed rotating counterweights, with intensive vibratory effect to compact granular fill materials and bituminous surfacing. The unit, known as Vibra-Tamp, weighs 225 lb and is used for tamping and finishing bituminous paving, compacting sand or earth fills, tamping inside buildings and paving work on railroad crossings. One man is said to be able to tamp up to 750 sq yd of surface per hour using 12-in lifts.

The 27-in tamping shoe delivers impact energy generated by dual rotary counterweight flywheels. The shoe is offset slightly ahead of these flywheels, thus producing a forward thrust that causes the machine to move forward.

The tamper is powered by a 3-hp, 4-cycle air-cooled gasoline engine and each flywheel is said to be capable of generating tamping energy up to 800 ft lb. The exhaust from the engine is passed through a jacket on the tamping shoe and the heat thus supplied is said to be an aid in tamping bituminous materials.

To make the machine readily portable, the entire assembly is supported by two fulcrum-mounted pneumatic tired wheels. The tamping shoe is raised and the machine tilted back on its wheels by pushing down on the operating handle. *Barco Manufacturing Company, Dept. RTS, 500 Hough St., Barrington, Ill.*

THE MONTH'S NEWS...

. . . among railway men—the associations—the suppliers

Changes in Railway Personnel

General

C. E. Vick, engineer maintenance of way for the Atlantic Coast Line at Jacksonville, Fla., has been appointed industrial agent at Wilmington N.C.

R. B. Wooters, division engineer on the Western Maryland at Cumberland, Md., has been appointed assistant superintendent with headquarters at Baltimore, Md.

R. J. Lane, assistant division engineer on the Rock Island at Rock Island, Ill., has been appointed special representative to the vice-president, operations, with headquarters at Chicago.

R. A. Gleason, superintendent of the Buffalo-Cleveland division for the Nickel Plate at Conneaut, Ohio, and an engineer through training and experience, has been promoted to assistant general superintendent at Bellevue, Ohio.

H. C. Tunison, chief engineer for the Lehigh & New England at Bethlehem, Pa., has been promoted to general manager with the same headquarters.

James C. Warren, formerly district engineer of the Buckeye region of the Pennsylvania, with headquarters at Columbus, Ohio, has been appointed associate general superintendent of the Hudson & Manhattan. In an announcement that appeared in the June issue, it was incorrectly implied that Mr. Warren was appointed associate general superintendent on the Pennsylvania.

Engineering

J. R. Derieux, Jr., assistant engineer on the Southern at Cincinnati, Ohio, has been promoted to assistant to chief engineer, maintenance of way and structures, at Birmingham, Ala. **Edward A. Gill** has been appointed division engineer at Alexandria, Va., replacing **Robert L. Fox,** whose promotion to process engineer structures at Washington, D.C., was announced in the June issue.

A. C. Parker has been appointed engineer maintenance of way, Southern division, for the Atlantic Coast Line at Jacksonville, Fla. Mr. Parker succeeds **C. E. Vick,** whose appointment as industrial agent is announced elsewhere in these columns.

Victor R. Cooledge, assistant engineer of bridges for the Southern Pacific at San Francisco, Cal., has been promoted to engineer of bridges with the same headquarters. Mr. Cooledge succeeds **J. P. Dunnagan,** who has retired.

R. S. Anderson, engineer maintenance of way for the Pittsburgh & West Virginia at Pittsburgh, Pa., has been promoted to assistant chief engineer maintenance at that point. **A. W. Herrington** has been appointed principal engineer at Pittsburgh.

B. S. Converse, division engineer on the Denver & Rio Grande Western at Grand Junction, Colo., has joined the New York Central as assistant engineer-system. Mr. Converse will be headquartered in New York.

T. F. O'Rourke, chief draftsman for the Frisco at Springfield, Mo., has been promoted to assistant engineer, chief engineer's office, at that point.

C. M. Kern, assistant division engineer on the Chesapeake & Ohio at Huntington, W. Va., has been promoted to division engineer at Hinton, W. Va., succeeding **H. S. Talman,** whose promotion to general supervisor bridges and buildings was announced in the June issue. **E. F. Hogan,** track supervisor at Marion, Ohio, succeeds Mr. Kern.

J. L. Leonard, track supervisor on the Erie at Susquehanna, Pa., has been appointed temporary assistant to engineer maintenance of way, Western district, with headquarters at Youngstown, Ohio.

T. D. Kern, assistant to division engineer on the Illinois Central at Vicksburg, Miss., has been promoted to division engineer at Memphis, Tenn., succeeding **N. R. Forbes,** who has been transferred to Jackson, Tenn. Mr. Forbes replaces **C. E. Weller,** who has been transferred to Waterloo, Iowa, replacing **N. R. Hill,** who has retired. **R. L. Harwood,** supervisor of track at Jackson, Miss., has been promoted to assistant to division engineer at Vicksburg replacing Mr. Kern.

Mr. Kern was born on March 16, 1920, at Mounds, Ill., and began his railway service with the Illinois Central on June 5, 1940, serving as a chairman and rodman at Paducah, Ky., until he entered the armed forces in 1942. Following his tour of military service, he attended the University of Virginia and graduated in 1949 with a BS degree in civil engineering. Immediately following his graduation, he rejoined the road and served successively as instrumentman, assistant supervisor of track and supervisor of track. He was appointed assistant to division engineer in 1953, which position he held until his recent promotion.

V. M. Schwing, whose promotion to engineer of track of the Bessemer & Lake Erie at Greenville, Pa., was announced recently (*RT&S*, May, p. 58), was born at Canton, Ohio, on March 20, 1920, and

V. M. Schwing

was graduated from Ohio State University in 1942 with a BS degree in civil engineering. Immediately following his graduation, he entered the armed forces and served 37 months in the Pacific Theatre as a member of the engineering corps. He joined the Bessemer & Lake Erie in February 1946 as assistant supervisor of track at Greenville and was advanced to supervisor of track in November 1948, which position he held until his recent promotion.

F. S. Schwinn, district engineer on the Missouri Pacific with headquarters at Houston, Tex., has retired effective June 30, and has established himself at Houston as an engineering consultant and analyst.

Howard C. Forman, assistant chief engineer of the Louisville & Nashville at Louisville, Ky., has been promoted to chief engineer at that point. Mr. Forman succeeds **L. L. Adams,** whose death was recorded in the June issue. **G. R. Sproles,** assistant engineer-miscellaneous-chief engineer's office, succeeds Mr. Forman. **Claude Johnston,** division engineer at Birmingham, Ala., succeeds Mr. Sproles.

Mr. Forman was born in Owen County, Ky., on August 11, 1895, and graduated from the University of Kentucky in 1920 with a BS degree in civil engineering. He began his railway service with the Louisville & Nashville in October of that year as an instrument-

(Continued on page 50)

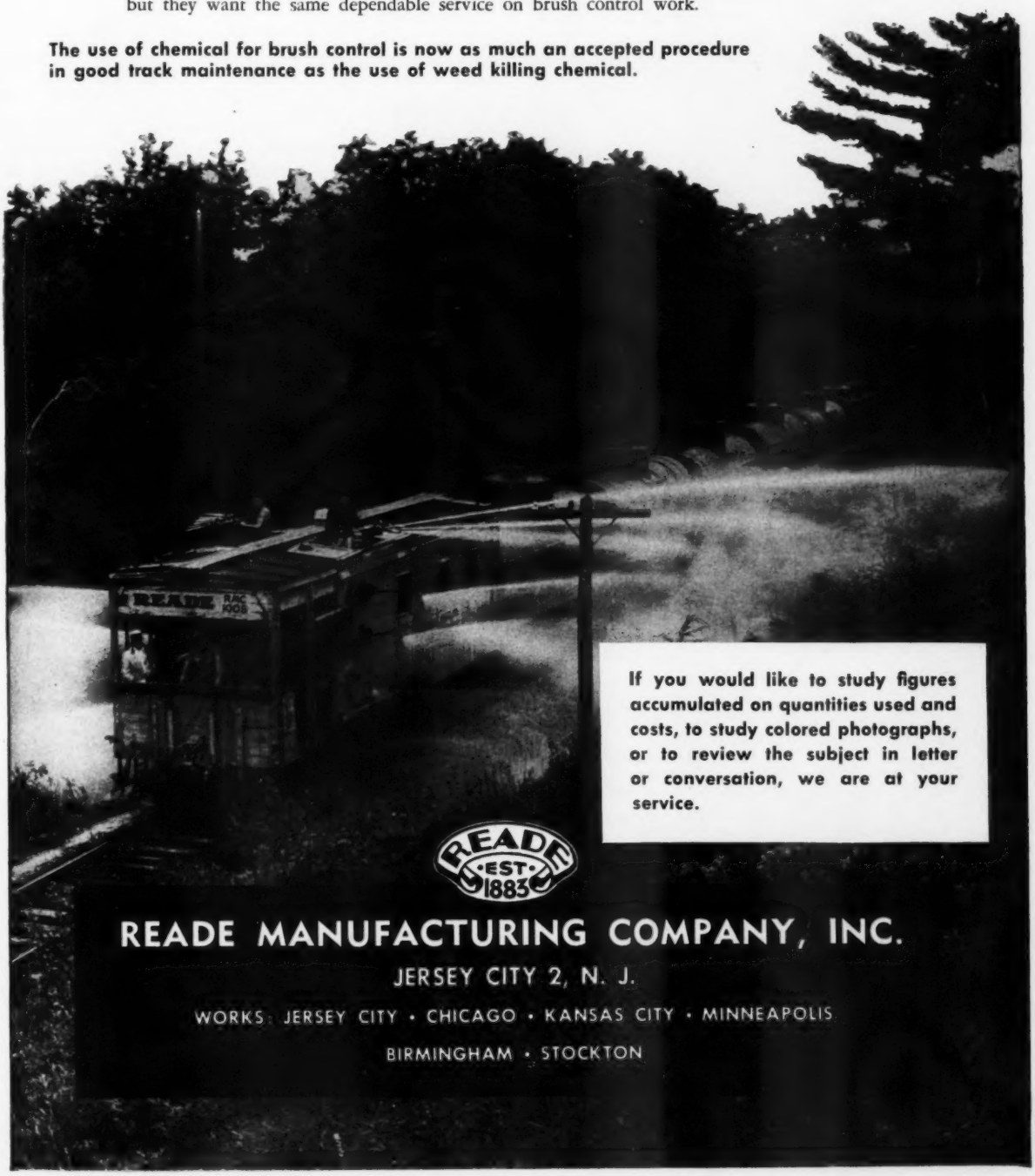
"LOOKS GOOD TO ME" . . .

"THE BRUSH WORK YOU DID IN 1955 ON OUR NEIGHBOR RAILROAD LOOKS GOOD TO ME. AFTER INSPECTING THIS WORK LAST WEEK, I ESTIMATED THAT THEY STILL HAVE AN 85% KILL."

"WE USED 55,000 GALLONS OF "HERBICIDOL" LAST YEAR. I FIGURE WE CAN GET BY WITH 45,000 GALLONS THIS YEAR. INCLUDE IN YOUR PROPOSAL BRUSH WORK ON THE SAME TERRITORY. MAKE YOUR USUAL INSPECTION AND LET ME HAVE YOUR PROPOSAL PROMPTLY."

This is typical of what is now happening in serving so many of our old railroad accounts. They not only want to continue with weed control work, but they want the same dependable service on brush control work.

The use of chemical for brush control is now as much an accepted procedure in good track maintenance as the use of weed killing chemical.



If you would like to study figures accumulated on quantities used and costs, to study colored photographs, or to review the subject in letter or conversation, we are at your service.

READE EST 1883

READE MANUFACTURING COMPANY, INC.

JERSEY CITY 2, N. J.

WORKS: JERSEY CITY • CHICAGO • KANSAS CITY • MINNEAPOLIS

BIRMINGHAM • STOCKTON

Railway Personnel (Cont'd)

man and subsequently held positions as assistant engineer, assistant division engineer and division engineer. He became assistant engineer in charge of the chief engineer's miscellaneous department in June 1944, and was appointed special engineer in May 1945. He was advanced to assistant chief engineer at Louisville in 1951, which position he held until his recent promotion.

J. R. Brayne, who has been promoted to division engineer on the Canadian National at Levis, Que. (*RT&S*, May, p. 58), was born on January 27, 1926, at Ste. Anne de Bellevue, Que., and was graduated from McGill University in

J. R. Brayne

1950 with a BS degree in civil engineering. Immediately following his graduation he entered the service of the Canadian National as an instrumentman at Cochrane, Ont., and subsequently held positions as junior assistant engineer and assistant engineer. He was promoted to assistant division engineer at Levis on June 1, 1955, which position he held until his recent promotion.

(*Continued on page* 54)

Dow

"Our ballast is clean as a whistle!"

Dow products keep vegetation down . . . keep roadbeds clean and safe

A lot of things make up a trainman's pride! His railroad's crack trains, for instance, and its reputation for smooth operation from the roadbed up. Weed-free ballast is the least of *his* worries. He leaves this to a "chemical crew" of Dow products—Radapon*, containing Dalapon Sodium Salt 85%, *and* 2,4-Dow* Weed Killer, Formula 40—to control grass and broadleaf weeds in roadbeds.

He leaves it to maintenance officials to plan a low-cost spraying program to keep right-of-ways brush-free, sightly and safe. It is to these men that Dow offers technical service and assistance on the use of Esteron® 245, Esteron Brush Killer and Esteron Ten-Ten*—plus the first two products mentioned. Write THE DOW CHEMICAL COMPANY, Agricultural Chemical Sales Department, Midland, Michigan.

*Trademarks of The Dow Chemical Company.

you can depend on
DOW AGRICULTURAL CHEMICALS

DOW

Railway Personnel (Cont'd)

Robert J. Clarke, who has been promoted to engineer of structures of the Pennsylvania at Cincinnati, Ohio (*RT&S,* May, p. 58), was born on September 1, 1920, at Philadelphia, Pa., was graduated from Drexel Institute of Technology

Robert J. Clarke

in 1945 with a BS degree in civil engineering. He entered the service of the Pennsylvania on December 16, 1945, as a draftsman in the office of the chief engineer, Eastern Region, and was advanced to inspector in September 1951. He was made supervising draftsman in 1952 and was advanced to assistant office engineer, office of assistant chief engineer structures, in November 1955, which position he held until his recent promotion.

D. E. Hiltz, roadmaster on the Canadian Pacific at Sherbrooke, Que., has been promoted to assistant division engineer, Montreal Terminals division, with headquarters at Montreal, Que.

Mr. Hiltz was born on March 3, 1922, at Annapolis Royal, N. S., and was

D. E. Hiltz

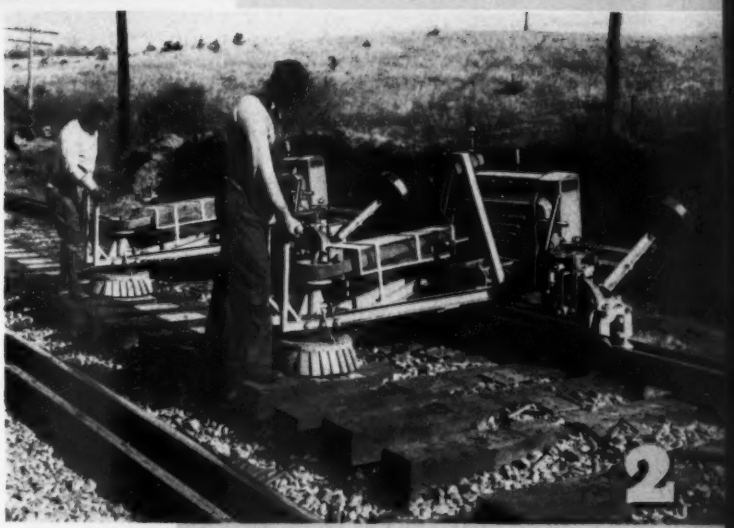
graduated from Acadia University in 1944 with a BS degree in engineering. He continued his education at Nova Scotia Technical College and entered the service of the Canadian Pacific on November 17, 1947, as a transitman at Kentville, N. S. He was made assistant

(*Continued on page* 58)

3 NORDBERG "Mechanical Muscles"®

that have become STANDARD EQUIPMENT for the nation's railroads

1 NORDBERG POWER WRENCH . . . Provides uniformly controlled tightening of track bolts. Operated by one man, the swinging arm of the Power Wrench easily reaches nuts on the inside and outside of rail. Proved in service on railroads across the country, this machine is ruggedly built to take hard service, yet light in weight to be easily handled on and off the track.



2 NORDBERG ADZING MACHINE . . . Properly prepares tie seats in keeping with today's track maintenance standards, all uniformly level and in same plane. In operation, the machine is held on one rail by adjustable guide rollers. The adzer is readily adjusted for various rail heights and can quickly be set on or off track.

3 NORDBERG SPIKE PULLER . . . Three men and machine easily pull from 30 to 45 spikes per minute, speeding up relaying and reducing the cost of the entire operation.

Proved on the nation's railroads, the Nordberg mechanical Spike Puller is simple in design, easy to operate and maintain. These factors assure low maintenance and maximum "on the job" time.

• **These are just three of the many Nordberg "Mechanical Muscles" that have become the standard for efficient maintenance on the nation's railroads.** ***It will pay you to investigate the full line of modern, money-saving Nordberg track maintenance machinery for meeting today's maintenance needs. For further details on any or all of these Nordberg machines, write for literature.***

R955

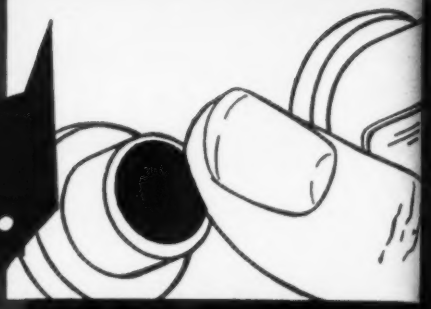
NORDBERG "Mechanical Muscles"®

ADZING MACHINE • BALLAST ROUTER • CRIBEX • BALLASTEX • SCREENEX • HYDRAULIC and MECHANICAL SPIKE PULLERS • SPIKE HAMMER • TIE DRILL • POWER JACK • POWER WRENCH • RAIL DRILL • RAIL GRINDERS • TRACK SHIFTER • DSL YARD CLEANER • TRAKLINER • GANG TAMPER • DUN-RITE GAGING MACHINE • GANDY—TIE PULLER and INSERTER

NORDBERG

NORDBERG MFG. CO.

PUSH THIS BUTTON...



Bonus-Powered

Try seconds-fast crawler starting. Famous International gasoline conversion, *in-seat* starting is *standard equipment* in all International diesel models! You get fast, positive, all-weather diesel starting, without *fooling* or *fouling!*

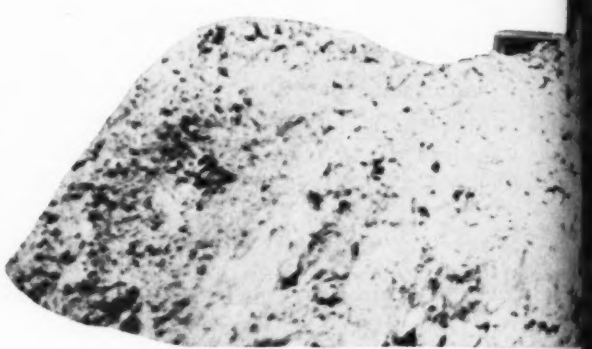
Try the lever-pull ease and power-transfer efficiency that new International Cerametallic engine clutch facings give you. And these self-cooling, long-lasting facings are of long-proved, well-known dry-type clutch design. No mystifying seals, circulators or "cold-sensitive" liquid to live with!

Feel-out new International crawler steering. Unrivaled TD-24 Planet Power steering with capacity-boosting power on both tracks, is responsive to even a school-boy's finger-tip touch! New hydraulic booster steering in new TD-18 and TD-14, reduces steering lever pull a big 75%. And new T-6, TD-6, and TD-9 are 25% easier to steer!

Above all, load up a new International crawler with matched or allied International equipment—prove how bonus-powered performance boosts production—daylighting curves, realigning right-of-way, cleaning ditches, and other maintenance-of-way jobs. Choose from 7 heavy-duty crawler models, 41.5 drawbar hp TD-6 to 200 net engine hp TD-24 Torque-Converter. See your nearby International Construction Equipment Distributor for a demonstration today.

Try it..

bonus-powered crawlers . . . matched dozers. This new 103 hp TD-18 (182 Series) is helping build streets in Saginaw, Michigan—dozing sand with International hydraulic dozer. Operator rides in adjustable, "club-car" comfort—has "control tower" job-bossing vision, and a clean, safe deck with ample "stretch-out" room.



Try it..

Try high-speed, easy-loading, big-capacity International Payscrapers. This road realignment job is really high-balling. Two fast-stepping International 75 Payscrapers push-loaded by an International TD-24 tractor get a heaping load in less than a minute—speed to the fill at 24 mph. Final grading is handled by two motor graders—powered by International Diesel engines. Try a new bonus-powered International Payscraper on your job. See how you get bigger payloads. *Prove new Payscraper capacity!*

Try new International®
performance on your job!

See you at the
ROAD SHOW
CHICAGO
Jan. 28 - Feb. 2, 1957

INTERNATIONAL HARVESTER

INTERNATIONAL®
Construction Equipment

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Beam Tractors . . . Self-Propelled Scrapers and Motor Graders . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks

engineer at St. John, N. B., in 1950 and was advanced to roadmaster at Annapolis Royal in September 1952. He was transferred to Sherbrooke, Que., in December 1955, which position he held until his recent promotion.

Edward R. Sanner, whose promotion to assistant to chief engineer maintenance of way and structures of the Southern at Atlanta, Ga., was announced recently (*RT&S,* May, p. 58), was born on December 1, 1908, at Ogden, Utah, and was graduated from the University of Illinois in 1932 with a BS degree in civil engineering. He entered the service of the Southern in July 1948 as assistant engineer at Knoxville, Tenn., and was advanced to office engineer at that point in September 1955. He was holding this latter position at the time of his recent promotion.

P. H. Geelhart, whose promotion to division engineer on the Milwaukee Road at Miles City, Mont., was announced recently (*RT&S,* May, p. 58), was born on January 25, 1913, at Monroe, Wash., and graduated from Montana State College in 1936 with a degree in mechanical engineering. He entered railway service with the Milwaukee on February 1, 1937, as a rodman at Savanna, Ill., and subsequently held positions as instrumentman and assistant engineer. He was advanced to assistant division engineer in 1948 at Mason City, Iowa, and was transferred to Sioux City, Iowa, in 1952, which position he held until his recent promotion.

L. M. Poitevin, who has been promoted to assistant district engineer on the Canadian National at Quebec, Que. (*RT&S,* May, p. 58), was born on August 9, 1918, at Riviere du Loup, Que., and graduated from McGill University in

L. M. Poitevin

1948 with a BS degree in civil engineering. Mr. Poitevin began his railway service with the Canadian National during the summer of 1944 in the department of research and development while attending the university and after his graduation was employed full time as an instrumentman at Cochrane, Que. He was advanced to assistant engineer in November 1950, at Quebec, and subsequently held positions as division engineer at that point and at Levis, Que. He was holding the latter position at the time of his recent promotion.

Track

A. P. Buono has been appointed acting track supervisor on the Erie at Susquehanna, Pa., replacing **J. L. Leonard,** whose assignment as assistant to engineer maintenance of way is announced elsewhere in these columns.

John Carey, track supervisor on the Rock Island at Peoria, Ill., has been promoted to roadmaster at Kansas City, Kan., succeeding **G. W. Williams,** who has retired.

E. Hawkins, extra gang roadmaster on the Milwaukee, has been promoted to roadmaster with headquarters at Iron Mountain, Mich. Mr. Hawkins succeeds **N. G. Schoemaker,** who has retired.

John W. Martin, assistant supervisor of track on the Chesapeake & Ohio at Marion, Ohio, has been promoted to track supervisor at that point succeeding **E. F. Hogan,** whose promotion to assistant division engineer is announced elsewhere in these columns. **Sidney O. Smith**

(*Continued on page* 60)

Railway Personnel (Cont'd)

has been appointed assistant supervisor track with headquarters at Grand Rapids, Mich., and **F. E. Huddleston, Jr.,** has appointed supervisor of track system, rail force, at Richmond, Va.

B. K. Pounders has been promoted to supervisor of track on the Illinois Central at Tutwiler, Miss., succeeding **P. H. Croft, Jr.** Mr. Croft has been transferred to Jackson, Miss., replacing **R. L. Harwood,** whose promotion to assistant to division engineer is announced elsewhere in these columns.

H. D. LeRoy, whose promotion to supervisor of track on the Illinois Central at Freeport, Ill., was announced recently (*RT&S,* May, p. 66), was born on August 9, 1927, at Chicago, and graduated from the University of Illinois in 1951 with a BS degree in civil engineering. He entered service of the Illinois Central in that year as a junior engineering aide at Clinton, Ill., and was advanced to junior engineer at that point in June 1953. He was promoted to assistant supervisor of track in October 1954, which position he held until his recent promotion.

S. W. Sweet, who has been promoted to supervisor track on the Bessemer & Lake Erie at Greenville, Pa. (*RT&S,* May, p. 66), was born on December 30, 1923, at Oneida, N. Y., and graduated from Tri-State College in 1947 with a BS degree in civil engineering. He began his railroad career with the Chesapeake & Ohio later that same year as a rodman at Columbus, Ohio, and resigned in 1948 to accept a position as assistant engineer on the Wabash. He joined the Bessemer & Lake Erie in January 1950 as assistant supervisor track and was made acting assistant field engineer in 1954. He was holding the latter position at the time of his promotion.

Andrew H. Steele, Jr., whose promotion to roadmaster on the Norfolk & Western at Williamson, W. Va., was announced recently (*RT&S,* May, p. 66), was born on March 31, 1918, at Bluefield, W. Va. Mr. Steele began his railway service with the Norfolk & Western in March 1940 as an extra gang laborer and subsequently held positions as welder helper, relief foreman and section foreman. He was promoted to assistant roadmaster on May 22, 1951, at Portsmouth, Ohio, which position he held until his recent promotion.

As announced in the June issue of *RT&S* (p. 72), **Joseph W. Smith, Jr.,** has been promoted to track supervisor on the Erie at Warsaw, N. Y.

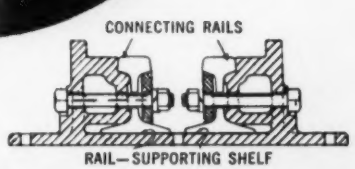
Joseph Smith was born at Passaic, N. J., on December 7, 1907, and attended Lafayette College. He began his railroad career with the Erie on June 10, 1929, as a rodman at Cleveland, Ohio. He was made draftsman in 1939 at that point and subsequently held positions in the research department and as general yard foreman at Youngstown, Ohio, and Buffalo, N. Y. He was advanced to track

(*Continued on page* 64)

4 JUMPS AHEAD OF COMPETITION...

Yes, the Universal Frog for yard service is built better 4 ways . . .

- It is made of an alloy electric cast steel that adapts itself to low cost electric or oxy-acetylene welding in track or shop.
- Tie plates are cast integral with the Universal Frog—an exclusive!
- Rail supports are cast integral on both ends of the Universal Frog —another exclusive!
- One-piece construction — no loose joints. Eliminates extra parts and cuts down maintenance costs.



HERE'S PROOF: Compare the cross sections of the Universal Frog with conventional types. Note the improved type rail joints, the patented supporting shelf, integral tie plates and rib construction.

⅜" RIB IN CENTERS OF ALL INTEGRAL TIE PLATES

LFM

ESTABLISHED IN 1872

THE L. F. M. DIVISION
ROCKWELL MANUFACTURING COMPANY
ATCHISON, KANSAS

One off-track rubber-tired

does the work of 3 trucks, 1 dragline

Builds earthfill causeways to replace wooden railroad trestles

When the Valdosta Southern Railroad decided to replace wooden trestles with easier-to-maintain earthfill causeways, company officials contracted all dirtmoving to the Jimmy Miller Construction Company, Valdosta, Georgia.

One causeway, a mile long, involved moving 27,000 yards of sandy clay fill. To move this dirt Jimmy Miller drove one self-powered, 7-yard D Tournapull, to the site of the trestle, near Pinetta, Florida. This trestle spanned a river, plus about a mile of very rough terrain. Except for a brief length crossing the river, none of the trestle track was carried more than 15 feet above the ground.

"D" went right to work spreading fill next to this trestle. When side fill reaches track-level, "D" fills center through the spacing between the ties. Then, trestle timbers, stringers, and ties are removed ... and tracks are relaid on the newly-placed earthfill.

This method of trestle replacement has been recently adopted on the Valdosta Southern. The first time it was used, a job that was expected to take three weeks, was completed in just four days. This makes for a very inexpensive replacement that permanently eliminates expensive structural maintenance.

1100' cycles take 2 minutes

When time studies were taken on the illustrated operation, "D" on 1100-foot cycles, was delivering a heaping load every 2 minutes.

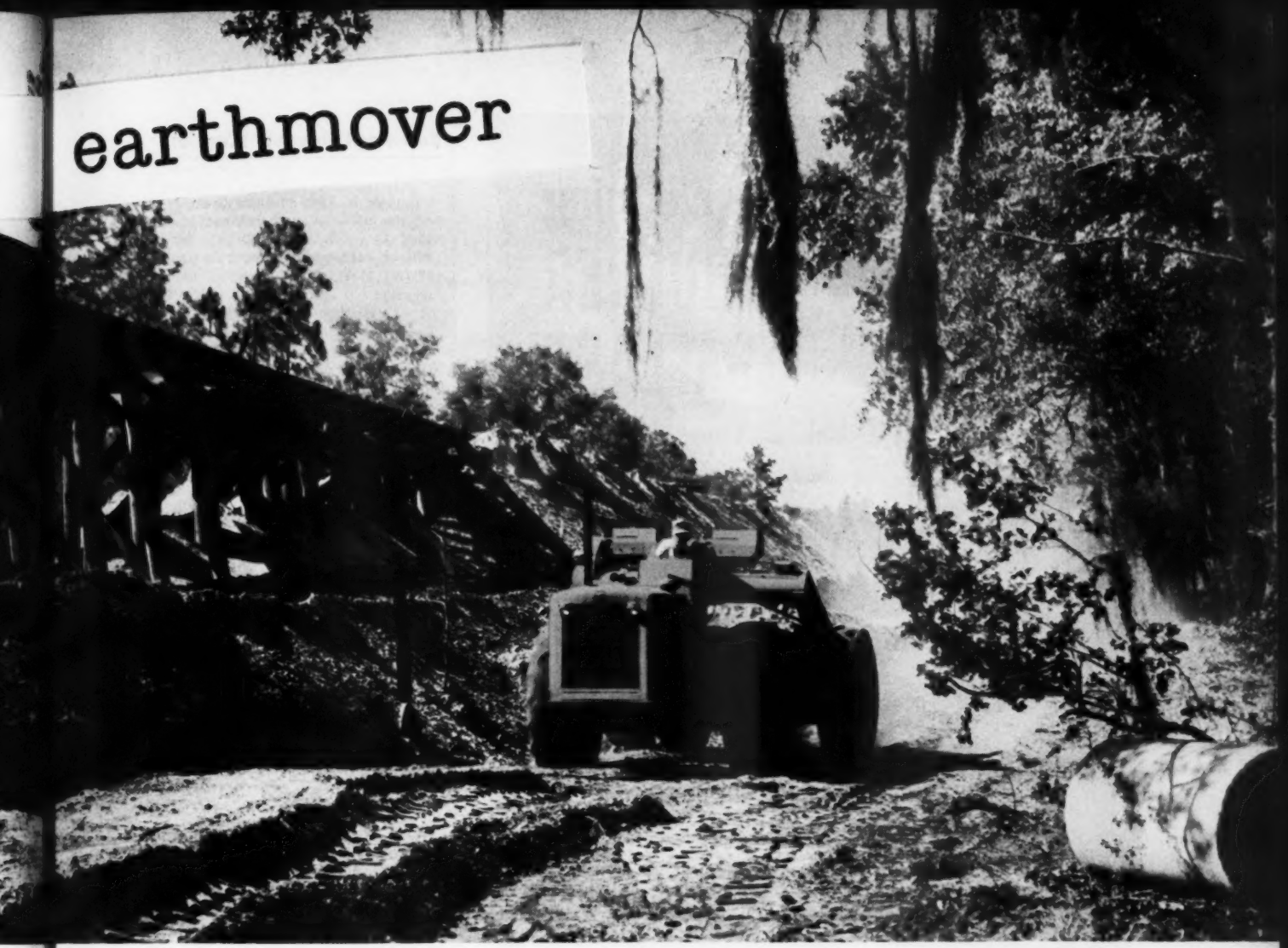
Push-loaded by a 66 hp crawler, "D" loaded sand up an 8% grade in 31 seconds. Hauling 500 feet, over a soft, rough haul road, took about 35 seconds. Spreading over an average distance of 40 feet took 23 seconds. Return time averaged 26 seconds. On another Valdosta Southern Railroad job, traveling mile-long, one-way hauls, this high-speed, "handyman" earthmover has delivered as many as 14 heaping loads in an hour.

Tournapull earthmoving answers RR problems

Big, low-pressure tires do not damage rails or switches...deflect to move loads evenly over obstructions...do not chamfer ties, or trip block signals. If "D" is on or near the track when trains approach, it can quickly get out of the way. No time is lost in deadheading work trains to the nearest siding. Through traffic is never delayed.

Time studies, taken in one uphill loading area, showed that the D Tournapull, pushed by a 66 hp crawler, traveled 60' up an 8% grade, to gather a full load of dead sand in 31 seconds.

earthmover



One of Tournapull's big advantages is its ability to travel under its own power, cross-country or over paved highways. Miller's machine, for example, was driven from Perry, Florida, to Valdosta, Georgia, and then to this job site near Pinetta, Florida.

"D" spreads its load of sand beside trestle in 15 to 35 seconds, depending on positioning of dirt around trestle timbers. This Tournapull has also been used to build shoulders for the South Georgia Railway in Valdosta, Georgia and in Perry, Florida.

Owner Jimmy Miller says, "Our D Tournapull has replaced three 8-yard trucks and a ½-yard dragline in handling track-fill operation for the Valdosta Southern Railroad. We can work our 'D' in tight quarters and on railroad trestles without holding up any trains."

Check Tournapull advantages

For lower cost contract grading, check prices of a LeTourneau-Westinghouse equipment owner. For maintenance with your own earthmoving equipment check advantages of the off-track D Tournapull railroad "handyman" as well as the larger Tournapulls and Tournatractor. We'll be glad to demonstrate the D Tournapull "handyman" on your line so you can see for yourself what its speed and versatility can do for you.

Tournapull, Tournatractor—
Trademark Reg. U.S. Pat. Off. DP-917-RR

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

GEARED TO PROGRESS

Railway Personnel (Cont'd)

supervisor in 1949 at Jamestown, N. Y., and was made general foreman at Hammond in 1955, which position he held until his recent appointment as track supervisor at Warsaw.

Bridge and Building

D. H. Fisher, assistant engineer on the Milwaukee at Chicago, has been promoted to supervisor bridge maintenance with the same headquarters, and **S. E. Kvenberg,** also assistant engineer at Chicago, has been promoted to supervisor building maintenance at that point.

H. S. Talman, whose promotion to general supervisor bridges and buildings on the Chesapeake & Ohio at Richmond, Va., was announced recently (*RT&S*, June, p. 74), was born on November 7, 1903, at Richmond and graduated from Virginia Polytechnic Institute in 1925. Immediately following his graduation, he entered the service of the Chesapeake & Ohio as a draftsman at Richmond and subsequently held positions as assistant cost engineer, track supervisor and assistant division engineer. He was advanced to division engineer in 1941 at Hinton, W. Va., which position he held until his recent promotion.

Special

A. G. Beatty, acting supervisor scales and work equipment on the Chicago & North Western at Chicago, has been officially assigned this position.

Raymond C. Collins, district supervisor of work equipment on the Erie at Susquehanna, Pa., has been transferred to Paterson, N. J. Mr. Collins' former position at Susquehanna has been abolished.

Association News

Roadmasters' Association

Plans for the annual convention of the association will be finalized at a meeting of the Executive Committee to be held at the Engineers' Club, Chicago, on July 9 under the direction of President W. M. S. Dunn. The annual convention, which will be held concurrently with that of the Bridge & Building Associations, will take place at the Conrad Hilton hotel, Chicago, September 18-20. At the meeting of the Executive Committee, the work of reviewing the six reports of the subjects committees, which was started at the May 14 meeting held in St. Louis, was completed, and other aspects of the convention program were discussed. Routine business was also transacted.

Bridge & Building Association

Much work was accomplished by the Executive Committee at a meeting held at the Engineers' Club, Chicago, on June 25. With President Joseph A. Jorlett presiding, the committee discussed plans for the convention to be held at the Conrad Hilton hotel, Chicago, September 18-20. The six reports of special committees, which are to form the basis of the convention program, were reviewed by the committee as a whole. In line with customary practice, the chairmen of most of the committees were present to read their reports. In general, the reports were found to be in excellent shape, and members of the Executive Committee expressed themselves as being confident that the annual meeting would come up to, or surpass the usual high standard.

American Railway Engineering Association

The usual summer lull in committee meetings of the association will occur in July. Only two such meetings have been schedlued for that month. The Committee on Water, Oil & Sanitation Services will meet at the Chicago Engineers' Club on July 24, and the Committee on Iron and Steel Structures has scheduled a meeting to be held at Denver on July 26-27. Plans are being made for the latter committee to inspect the laboratories of the U. S. Bureau of Reclamation at Denver, and also possibly to make an inspection trip to the University of Colorado at Boulder.

Supply Trade News

General

Gardner-Denver Company (Canada), Ltd., has announced the opening of a new district sales and service office at 1400 Sargeant Ave., Winnipeg, Man. The new office will serve customers throughout Manitoba, Western Ontario and Eastern Saskatchewan.

The Chapman Chemical Company has moved its home office at Memphis, Tenn., into its own building at 60 N. Third Street.

Sperry Rail Service, Danbury, Conn., has acquired the Type FE-1 railroad communications radio manufactured by **Westinghouse Electric Corporation.** The equipment will be manufactured, marketed and serviced as the Sperry Radio System.

The **Western Railroad Supply Company**, Chicago, has acquired all the assets, including inventory, of the Track Appliance Department of the Buda Division, Allis-Chalmers Manufacturing Company.

Manufacturing activities will be transferred to a new plant acquired for the purpose by Western Railroad Supply just north of its own plant at 2428 Sou. Ash-

(*Continued on page* 66)

land Avenue, Chicago. Manufacture and sale of the Buda line of track appliances will be carried on by a new division of Western Railroad Supply, known as the Maintenance of Way division. The Buda line of material-handling equipment will continue to be manufactured and sold by Allis-Chalmers' Buda division.

Personal

Theodore S. Petersen has been appointed assistant sales manager for the **"Quick-Way" Truck Shovel Company,** Denver, Colo. **Douglas Corner, Jr.,** has been appointed district sales representative for California, Nevada and Arizona, succeeding to a position held by Mr. Petersen before his recent appointment.

Merwin H. Dick, editor of *Railway Track and Structures* and western editor of the *Railway Age,* has been elected a vice-president of the **Simmons-Boardman Publishing Corporation,** his assignment being that of chief engineering editor of the company's railway publications. His headquarters will continue to be, as heretofore, in Chicago. **Joe W. Kizzia,** transportation editor, has been promoted to western editor of the *Railway Age,* also with headquarters in Chicago. Mr. Dick is an engineering graduate of the University of Kansas and learned his railroading on the Santa Fe. He has been on the editorial staff of the *Railway Age* and *Railway Track and Structures* since 1929. Mr. Kizzia is a graduate in journalism from Northwestern University and is the former editor of a weekly newspaper in Arkansas. He got his practical railroad training with a railway operating battalion in Europe during World War II. He has been a member of Railway Age's editorial staff since 1949.

J. A. Holmes has been elected president of the **National Aluminate Corporation,** Chicago, succeeding **H. A. Kern,** a founder of the company, who continues as chairman of the board of directors. **Frank H. Thorne,** retiring senior vice-president, retains his post as vice-chairman of the board of directors. **Paul E. Dempsey** has been promoted to manager of railway service, succeeding **R. G. Bielenberg** who has been promoted to assistant vice-president.

F. W. Evinger, supervisor of railroad sales of the **Lehon Company,** a wholly owned subsidiary of the **Philip Carey Manufacturing Company,** has been appointed manager of railroad sales for both companies, with headquarters at

F. W. Evinger

Bellwood, Ill. Mr. Evinger has a record of 21 years of experience with the Union Pacific, the major portion of which was spent in the engineering department. He then spent eight years with a major paint manufacturer as a railroad sales representative, and served four years as supervisor of railroad sales of the Lehon Company.

Walter G. Roth and **John Hensel,** district sales managers for the **Western Railroad Supply Company,** have been appointed vice president and general sales manager, respectively. **W. E. Glasby** has joined the company as advertising manager.

Charles W. Reene has been appointed to the newly created position of director of educational services for the **Portland Cement Association. Leo H. Corning** has been appointed to the newly created position of director of promotion planning and **George H. Paris,** assistant director of promotion, has been appointed assistant to the vice president for promotion.

W. E. Gadd has rejoined the **Rail Joint Company** as vice-president, and **W. J. Acker** has been appointed assistant to president. They will both have headquarters in New York.

Joseph W. Bonin, sales engineer for **Fairbanks, Morse & Co.**, at Fair Lawn, N. J., has been transferred to Cleveland, Ohio.

Obituary

Albert J. Grother, vice-president and general manager, Iowa-Nebraska division of Armco Drainage & Metal Products, Inc., died April 27 in Fort Wayne, Ind.

Cash Awards for Oldest Issues of Railway Age

Railway Age, celebrating its hundredth anniversary this fall, will award $100 to the person or firm which submits proof of ownership of the copy of this paper—or its predecessors—bearing the oldest dateline. Holder of the second oldest copy will get $50.

Holder of the oldest issue and runners-up will be announced in Railway Age's Centennial Issue, which will "take stock" of the railroad industry on a comprehensive scale with "a look behind, around, and ahead."

Railway Age has three separate lines of ancestry; the oldest issue of any of the three will qualify. Here they are:

1. *Railroad Gazette*—starting as Western Railroad Gazette, November 15, 1856, dropped "western" in 1870. Remained Railroad Gazette until merger with Railway Age in 1908.

2. *Railway Age*—started with issue of June 17, 1876. In 1891 absorbed Northwestern Railroader (founded 1887), and added its title to the masthead until 1901, when it again became Railway Age alone. Upon merger with the Gazette the paper used the combination title Railway (later Railroad) Age Gazette. In 1918 the durable title Railway Age again emerged intact.

3. *Railway Review*—starting as the Chicago Railway Review in 1868, became Railway Review in 1879; Railway & Engineering Review in 1897 and again Railway Review in 1914. It was absorbed by Railway Age in 1927.

Do not be fooled by differences in size and appearance of the older issues. All three lines of ancestry ran numerous small advertisements — mostly non-illustrated—on the front covers—which, on Gazette and Age, were yellow. The sizes of both the Gazette and Review were considerably larger than today's Railway Age.

Please do not send the issues to us. Merely submit statement of proof, or a photostat or photograph of front cover or masthead page to Editor, Railway Age, 30 Church St., New York 7. To be eligible, entries must be received no later than July 1, 1956. Sorry, public libraries and archives don't count.

Helps From Manufacturers

The following compilation of literature —including pamphlets and data sheets —is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

HIGH-STRENGTH BOLTS. Instructive booklet gives the plain facts on high-strength bolts. It presents all the information needed in order to use such bolts when erecting a building or bridge, or repairing equipment. (Write: *Russell, Burdsall & Ward Bolt & Nut Co., Dept. RTS, Port Chester, N. Y.*)

CRAWLER TRACTORS. 15-page booklet "Let's Talk Tractors" features the D6, D4 and D2 tractors. It illustrates such topics as how to multiply the work power of a tractor, how to cut operating costs, and how to keep machinery young. Copies available in English, Spanish, French and Portuguese. (Write: *Caterpillar Tractor Company, Dept. RTS, Peoria, Ill.*)

ENGINES. 16-page booklet (CR-637-F) entitled "New Heavy-Duty Power Where You Need It Most" explains the design and engineering features of the new International V-8 engine. Also explains the testing, development and proving program that all models in the "V-Line" were put through. (Write: *Consumer Relations Dept., International Harvester Company, Dept. RTS, 180 N. Michigan Avenue, Chicago 1.*)

STEEL FLOOR ARMOUR. "Specification and Installation Manual" illustrates the methods for prolonging the life of industrial floors with Hexteel heavy-duty floor armour and Floorsteel flexible type floor armour. (Write: *Klemp Metal Grating Corporation, Dept. RTS, 6615 S. Melvina Avenue, Chicago 38.*)

SIGNS AND CROSSBUCKS. 12-page booklet "Kaiser Aluminum Signs and Railroad Crossbucks" lists sizes and availabilities of various types of sign blanks. Also included is detailed information on methods of finishing aluminum sign panels by applying reflective sheeting, paint, baked enamel and porcelain enamel. (Write: *Kaiser Aluminum & Chemical Corp., Consumer Service Division, RR-856, Dept. RTS, 1924 Broadway, Oakland 12, Calif.*)

ELECTRIC PLANTS. 8-page, 3-color catalog (A-428) describes the complete lines of Onan electric generating plants. Each separate series—1-cylinder air-cooled models; 2-cylinder air-cooled models; 4, 6 and 8-cylinder water-cooled models and air-cooled diesel models—is listed in complete detail. Optional accessories available for the units are also listed. (Write: *D. W. Onan & Sons, Inc., Dept. RTS, Minneapolis 14, Minn.*)

EARTHMOVING EQUIPMENT. 16-page illustrated booklet (No. 36) tells how to get more work out of your rig. Helpful hints on hydro-flation, low cost compaction, care of tires, larger payloads and preparing the equipment for summer or winter work are effectively explained. (Write: *LeTourneau-Westinghouse Company, Dept. RTS, Peoria, Ill.*

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The Columbia, Newberry & Laurens Railroad

USES A D6 AND NO. 60 SCRAPER TO REDUCE A CURVE

Two miles north of Little Mountain, S. C., the Columbia, Newberry & Laurens Railroad had a sharp curve. Then a Cat* D6 Tractor and No. 60 Scraper moved in and took out the worst of it.

The efficient big yellow team cut down grade to make it possible to move the track. Then the hard-working off-track rig filled in the old cut. In the past year, the railroad has used this same productive team to build 18 miles of roadbed.

And now the work life of these fast-moving Caterpillar units is greater than ever. The D6 is equipped with the exclusive Caterpillar oil clutch requiring very little adjustment. Clutch plates, cooled and lubricated with oil, give far longer wear. Maintenance costs are reduced. Work life prolonged.

The No. 60 Scraper has a capacity of 7 cubic yards struck, 9 cubic yards heaped. Now many models of Caterpillar-built Scrapers have been given the new, efficient LOWBOWL design which enables you to load more material in less time. All down the Caterpillar off-track line, new models have been created and new refinements added to increase production and dependability.

Now it's more important than ever to see your Caterpillar Dealer. He has virtually an entire new line of money-saving off-track equipment to demonstrate—on your job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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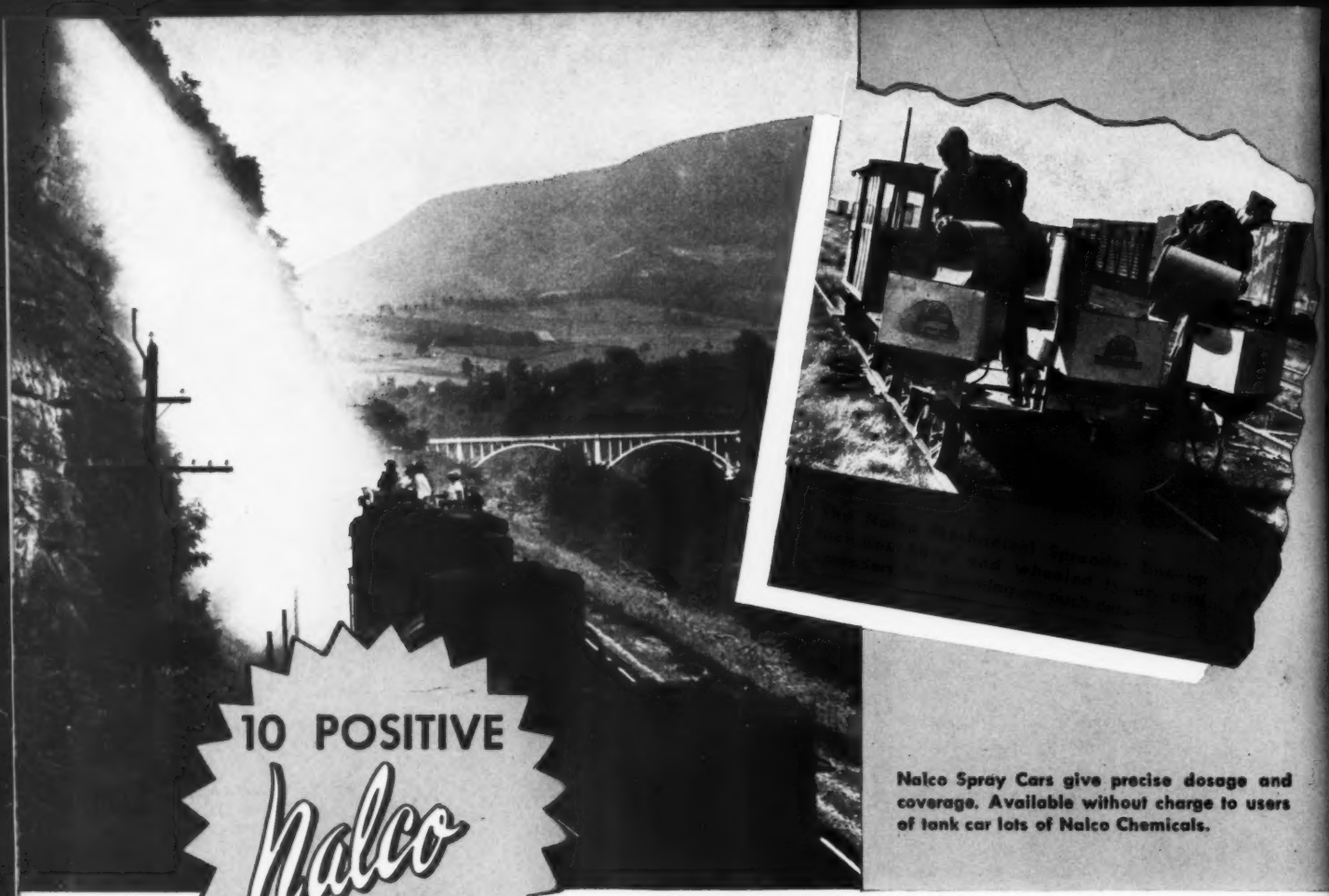
IMPROVE TRACK

Our heavy railway spring washers assure adequate reserve power to hold rails and joints tight longer. They protect track continuously.

THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.

A COMPLETE LINE OF RAILWAY SPRING WASHERS



Nalco Spray Cars give precise dosage and coverage. Available without charge to users of tank car lots of Nalco Chemicals.

10 POSITIVE *Nalco* WAYS for ALL-SEASON WEED and BRUSH CONTROL

● Whatever your particular weed, grass or brush control problem — Nalco has the safe, sure answer in this complete selection of proved chemical treatments . . . *10 in all.*

Nalco also assures the most *economical* application possible . . . with mechanical spreaders and shaker boxes for small and hard-to-reach areas . . . with various sized drums, and tank car lots for use in modern Nalco Spray Cars.

Right now is the time to start your full-season weed control program with Nalco Chemicals. Ask for full facts on scheduling and prices.

	CHEMICAL	DOSAGE	APPLICATION	SHIPPED
1	Nalco H-170 Weed Control	One gal. per 1000 sq. ft.	After predominant weeds emerge.	Tank cars and 54 gal. drums.
2	Nalco H-1708 Weed and Grass Control	One gallon per 4500 sq. ft. with one gal. H-170 per 1500 sq. ft.	After predominant grasses emerge. Use in combination with Nalco H-170.	Tank cars.
3	Nalco H-174 Weed and Grass Control	200 to 400 lbs. per acre.	Best applied in early spring or just before rainy season.	100 lb. drums and 3½ lb. shaker boxes.
4	Nalco H-175 Dormant Brush Control	Dilute 10 gal. with 90 gal. diesel oil, etc. Use 25 to 40 gal. per acre.	Thoroughly wet basal area of plant.	54 gal. drums.
5	Nalco H-176 Brush Control	Dilute one gal. to 135 gal. of water. Use 100 to 300 gal. per acre.	Thoroughly wet brush after leaves are out.	Tank cars and 55 gal. drums.
6	Nalco Dalapon (liquid) Weed and Grass Control	Dilute 10 gal. with 90 gal. of water. Apply 100 gal. per acre.	After predominant grasses emerge. Use in combination with Nalco 2, 4-D.	Special 8000 gallon tank cars.
7	Nalco 2, 4-D Alkanolamine Weed Control	Dilute up to 3 gal. with 100 gal. dalapon solution per acre.	After predominant weeds emerge.	Tank cars and 55 gal. drums.
8	Ammate (liquid) Brush Control	Use 100-300 gal. per acre of dilute solution containing ⅜ lb. per gal.	Thoroughly wet brush after leaves are out.	Tank cars.
9	Penta and Oil Weed Control	Dilute 30 gal. with 170 gal. water per acre.	After predominant weeds and grasses emerge.	Tank cars.
10	2, 4, 5-T (liquid) Brush Control	Dilute 1 gal. to 135 gal. of water. Use 100-300 gal. per acre.	Thoroughly wet brush after leaves are fully grown.	55 gal. drums.

NATIONAL ALUMINATE CORPORATION
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